

The Mining And Metallurgical Journal

VOL. XXI. NO. 6

LOS ANGELES, CAL.,

June 15, 1899,

NEW YORK, N. Y.

Price 15 Cents

ASSAYER and CHEMIST

Mark samples plainly, advise by letter of full details, with charges enclosed. Postage on ore one cent per ounce.

C. H. VOLLM

34 Roxwell Bldg. SEATTLE, WASHINGTON

Oiled and Paraffined Canvas Covering for Machinery, etc.

Tents and Canvas Sheeting

JOHN HARRISON.

167 South Street, New York

PATENTS!

TOWNSEND BROTHERS
SOLICITORS
OF PATENTS

Patents on Inventions secured in all countries. Copyrights, Trade Marks and Labels. OFFICE, 321 Potomac Block Telephone 347. Los Angeles, Cal

The Edward P. Allis Company

MILWAUKEE, WISCONSIN

SEE PAGE 23

A. H. HANDLAN,
President and Manager

E. W. HANDLAN,
Secretary and Treasurer

M. M. BUCK MFG. CO.

Railway and Contractors Supplies

Machine Tools, Heavy Hardware and Metals; Mine, Mill, Smelter and Foundry Supplies; Manufacturers of Locomotive Head Lights; Train and Station Signal Lights, Lanterns, Oil Filters, Lubricators, Injectors, &c.

921 North 3d Street,

St. Louis, Mo.

Joseph Dixon Crucible Co.

MINERS, IMPORTERS AND MANUFACTURERS

GRAPHITE & PLUMBAGO

JERSEY CITY, N. J.

RETORTS, CRUCIBLES, GRAPHITE LUBRICANTS, BELT DRESSING, GRAPHITE PAINTS, LEAD PENCILS, AND GRAPHITE PRODUCTS OF ALL KINDS.

Send for Production Catalogue.

Graphite Makes the Best Lubricant and Best Paint.

ADAMANTINE SHOES & DIES

AND

CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

These castings are extensively used in all the Mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to above conditions. When ordering send sketch with exact dimensions. Send for Illustrated Circular.



CHROME STEEL WORKS,

Kent Ave. & Keap St., BROOKLYN, N. Y.

The Pelton Water Wheel

Affords the Most Economical and Reliable Power for Mining, Electric and all other purposes.

9000 WHEELS NOW RUNNING

PELTON WATER WHEEL CO., 121 Main St., San Francisco, Cal.

Mexican, American and Foreign Patents, TRADEMARKS, ETC.

Reports on Mining and Other Properties. Proprietors of Weekly Anglo-American, a first-class Advertising Medium. Established 9 Years.

C. H. M. y Agramonte,
P. O. Box 888. Cable Address, "Agra". CITY OF MEXICO, MEXICO



1543 Marquette Building,

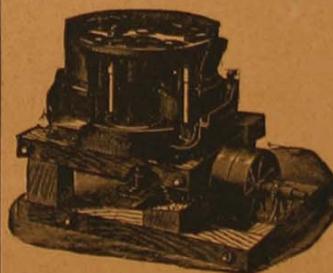
Chicago, Illinois

PARKE & LACY COMPANY

21 and 23 FREMONT STREET, SAN FRANCISCO, CAL.

LICENSEE FOR THE MANUFACTURE AND SALE OF

The Huntington Centrifugal Roller Quartz Mill



The Construction of this mill has lately been much improved and we claim it to be the CHEAPEST, MOST EFFICIENT, SIMPLEST, AND MOST DURABLE MILL UPON THE MARKET.

Agents for Knowles' Pumps and Pulsometer Pumps

← CATALOGUE UPON APPLICATION →

Los Angeles, Cal. Office, 306 Byrne Building. W. H. Miller, Representative



ST. LOUIS, MO.

JOHN STEWART

MINING ENGINEER

Address:—Mining and Metallurgical Journal
LOS ANGELES, CAL.

Examines and Reports on Mineral Properties
Assessment Work Performed for Non-Residents



Peerless Spiral Packing

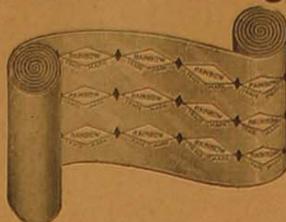
Piston and
Valve Rod
Packing

Expressly for High Speed
Engines. Will Hold 400 lbs.
Steam. The best packing for
MINING USES

20 YEARS OLD
AND NO EQUAL

The Peerless Rubber Mfg. Co., 16 WARREN STREET, NEW YORK

Rainbow Packing



THE COLOR OF RAINBOW PACKING IS RED

Three rows of Diamonds in Black through-
out the length of each and every roll. No
baking or following up.



FOR UNION HAND HOLES AND MAN-
HOLES. $\frac{3}{8}$ in. for pipe unions. $\frac{1}{2}$ in. for
hand holes $\frac{5}{8}$ in. for manholes. $\frac{3}{4}$ in. for extra
large man-holes.

16-24 Woodward Avenue, Detroit, Mich. 202-210 S. Water Street, Chicago, Ill.
Dunham, Carrigan & Hayden Co., San Francisco, Cal.

California Vigorit Powder Co.

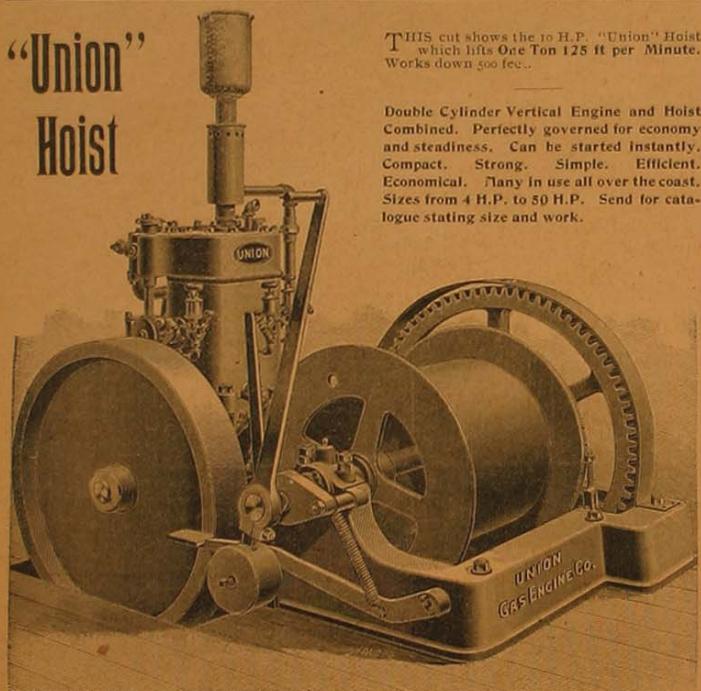
Manufacturers of

Dynamite High Explosives and "Vigorit Low" Blasting Powder

OFFICE: 208 California Street,
San Francisco, Cal.

WORKS: Point Isabel,
Contra Costa Co. Cal.

"Union" Hoist



THIS cut shows the 10 H.P. "Union" Hoist
which lifts One Ton 125 ft per Minute.
Works down 500 feet...

Double Cylinder Vertical Engine and Hoist
Combined. Perfectly governed for economy
and steadiness. Can be started instantly.
Compact. Strong. Simple. Efficient.
Economical. Many in use all over the coast.
Sizes from 4 H.P. to 50 H.P. Send for cata-
logue stating size and work.

Union Gas Engine Co.,
301 Howard Street, - - - San Francisco, Cal.

The only Genuine ALBANY GREASE
has this TRADE MARK one very pack-
age. Look out for Yellow Label.



ALBANY GREASE

Lubricates Everything

Especially Adapted to Mining and Mill-
ing Machinery.

MADE ONLY BY

ADAM COOK'S SONS,
313 WEST ST., NEW YORK.

BRANCHES:

TATUM & BOWEN,
34 Fremont Street, San Francisco, Cal.
42-49 First St., Portland, Oregon.

55 So. Canal Street, Chicago, Illinois.

MANUFACTURERS OF

Albany Dynamo & Albany Cylinder Oils
If you are not using these Oils give them a trial
at once, and we know the result. You will want
no other

THOMPSON & BOYLE CO.

(Incorporated)

MANUFACTURERS OF

T & B.

STEEL MINING PIPE

Cyanide Tanks, Water Tanks, Air Pipe,
Hydraulic Mining Material

310-314 Requena St.,

Los Angeles, Cal

WILLIAM H. EMANUEL,

REPRESENTING

RAND DRILL COMPANY,
THE EDW P. ALLIS CO.,

Air Drills and Compressors
General Mining, Milling and Smelting

TRENTON IRON CO.,
HENRY R. WORTHINGTON, ROBIN'S BELT CONVEYOR

Machinery and Reynolds Corliss Engine
Wire Rope and Bleichert Tramways

DENVER

COLORADO

The Baker & Adamson Chemical Co.

MANUFACTURERS OF

Strictly Chemically Pure Acids and
Chemicals and Ashless Filter
Papers

EASTON, PENNSYLVANIA

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

The Baker & Adamson Chemical Co.

MANUFACTURERS OF

Strictly Chemically Pure Acids and
Chemicals and Ashless Filter
Papers

EASTON, PENNSYLVANIA

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

ROBIN'S BELT CONVEYOR

COLORADO

Air Drills and Compressors

General Mining, Milling and Smelting

Machinery and Reynolds Corliss Engine

Wire Rope and Bleichert Tramways

General Service and Mining Pumps

CHAS. C. MOORE & CO.

ENGINEERS AND DEALERS IN

BABCOCK & WILCOX BOILERS.

McINTOSH & SEYMOUR ENGINES,

HAMILTON CORLISS ENGINES,

N. Y. SAFETY AUTOMATIC ENGINES,

GOUBERT FEED WATER HEATERS,

STRATTON STEAM SEPARATORS,

SNOW STEAM PUMPS,

QUIMBY SCREW PUMPS,

GREEN'S ECONOMIZERS,

WHEELER CONDENSERS,

BARNARD-WHEELER COOLING TOWERS,

HOPPES LIVE STEAM PURIFIERS

EDMISTON FEED WATER FILTERS,

BUNDY STEAM TRAPS,

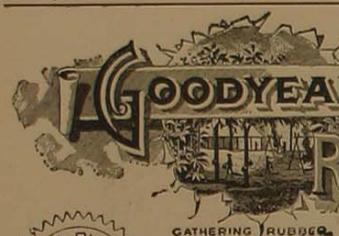
SPENCER DAMPER REGULATORS,

HYATT ROLLER BEARINGS.

Watch this Space for description of the above Machinery.

Send for Catalogue and Full Information.

32 First Street, San Francisco, Cal.



Crack Proof Boots, White Rubber Coats, Oil Clothing

BELTING, PACKING AND HOSE

573, 575, 579 Market Street,
SAN FRANCISCO, CAL.R. H. PEASE, 73 and 75 First St.
Vice President and General Manager. PORTLAND, OREGONGOODYEAR'S
RUBBER GOODS
— FOR —
Miners and MiningEstablished 1872.
F. E. BRANDIS, SONS & CO.,
ENGINEERING
INSTRUMENTS
FOR ALL PURPOSES.
812-814 GATES AVE., BROOKLYN, N.Y.
Catalogues mailed on application.All those interested
IN MINING
Should Join the
SOUTHERN CALIFORNIA BRANCH
of the
California Miners' Association
Secretary's Office:
420 Stimson Block. Los Angeles, Cal.

JENA Trade Mark
Normal Glass
• SCHOTT & GEN.
• JENA
•
CHEMICALS AND
CHEMICAL APPARATUS
•
ASSAY BALANCES
Finest Ever Made
•
Specialties:—Analytical Portable Balances, Porcelainware, Platinum goods, Crucibles, Cupels, Scorifiers, Muffles, Furnaces, C. P. Acids, etc.
•
Everything Necessary for Assayers
•
Elmer & Amend,
3d Ave. Cor of 18th St. New York

MATHISON & CO.
25-27 CEDAR ST.,
NEW YORK CITY
-- ANTIMONY --
BUY
ANTIMONY ORES AND
CRUDE ANTIMONY
* WRITE FOR FULL PARTICULARS

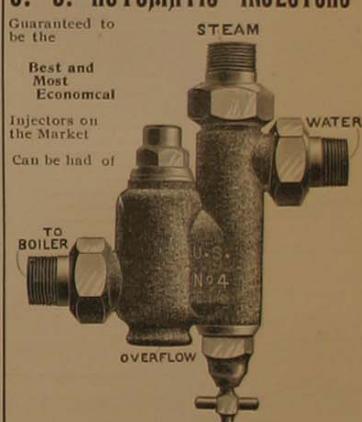
The Colorado and California
Mineral Developing Company
432-3-4 STIMSON BLOCK, LOS ANGELES, CAL.

Prospecting, Developing of Mines, Mine Operators, Locating, Buying and Selling of Mines a Specialty, Financial Agents for Eastern Capitalists.

CAPITAL STOCK, \$200,000

Correspondence Solicited

U. S. AUTOMATIC INJECTORS



Mitchell Staver & Lewis Co., Portland, Ore.
Mitchell Staver & Lewis Co., Seattle, Wash.
Schaw-Ingram Batcher Co., Sacramento, Cal.
Henshaw, Bulkley & Co., San Francisco, Cal.
And of Jobbers and Dealers generally.
Catalogue Free.

American Injector Co., Detroit, Mich. U. S. A.



THE MAIT DRY GOLD SAVER

was invented and patented by a man who has followed mining in California since the early 50's, and is the only thoroughly practical "DRY WASHER" ever invented, will save a larger per cent. of gold than any other machine. It is Cheap, Light and Durable, runs easy, will not blow the gold off. Can be easily carried and packed.

The material used in its construction is of the best, and is well bolted and screwed (not nailed) together, and is easily taken apart. Woodwork is of spruce and poplar; castings, iron and brass; lining, galvanized iron; riffle screen, No. 70 mesh, brass wire; hopper screen $\frac{1}{2}$ in mesh, well secured, fans galvanized iron.

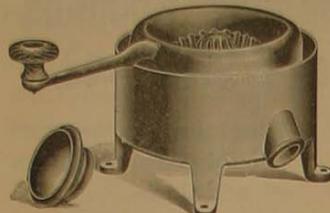
PRICES, Prospector \$15; Small Size \$35; Medium Size \$40; Large Size \$50. Any amount of References given.

A. G. GODFREY, Manufacturer,

311½ West Seventh St., Los Angeles, Cal.

A NEW MORTAR

That is a crusher and pulverizer combined

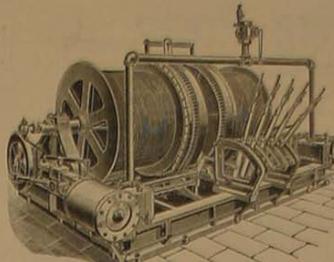


Weight 10 lbs.; Diameter 10 1/2 in.; Height 8 1/2 in.
Bills a long-felt want. Send for descriptive circular.
Crusher Pulverizer No. 1, \$25.00.

J. E. Surman & Co., 74 Cortlandt St., New York

Lidgerwood Hoisting Engines

Built to gauge on the Duplicate Part System. Quick Delivery Assured.

**Mine Hoists,**

STEAM AND ELECTRIC

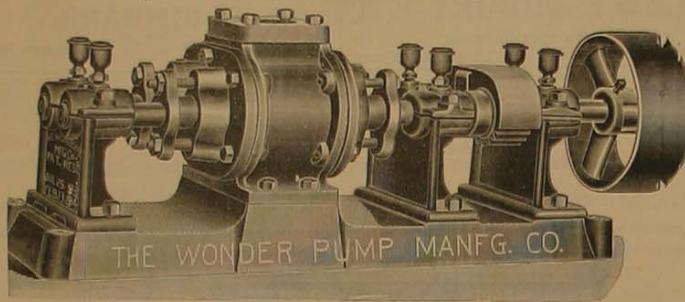
CABLEWAYS Hoisting and Conveying Devices

SEND FOR CATALOGUE

Lidgerwood Mfg. Co.

96 Liberty Street,

New York

The Improved WONDER Irrigation Pump

We also Build Vertical Style for Mining Purposes.
Write for full particulars and Catalogue.

Wonder Pump Mfg. Co.,

MACHINERY & ELECTRICAL CO., Los Angeles, Cal., Agents for California.

**KANSAS CITY,
Missouri.****Sulphuric Acid**

Also Strictly Chemically Pure

AMMONIA and

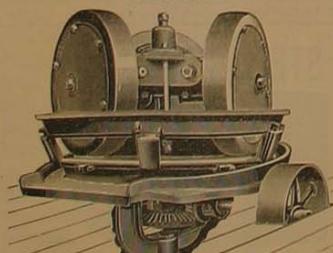
for Laboratory Use and Fine Chemical Work.

* SCHOOL OF *
Practical Mining, Civil, Mechanical,
Electrical Engineering, Metallurgy,
Cyanide Process, &c.
Surveying, Architecture, Drawing and Assaying.
933 MARKET ST., SAN FRANCISCO, CAL.

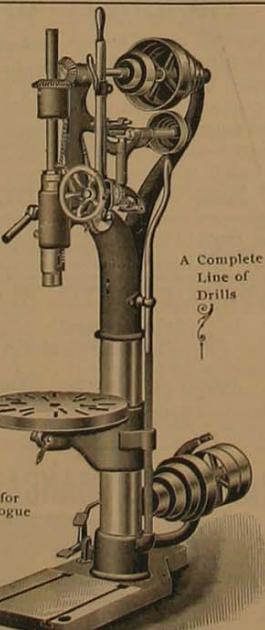
A. VAN DEN NAILLEN, President.
Assaying of Ores, \$25.; Bullion and Chlorination
Assay, \$25.; Blowpipe Assay \$10. Full Course
of Assaying, \$50. Established 1864.
Send for Circular.

**The F. M. Davis
IRON WORKS CO.**

Office and Works 23 to 743 Larimer Street
Corner 8th Street, DENVER, COLO.

**THE DAVIS IMPROVED
CHILI MILL****SIMPLE, DURABLE, EFFICIENT**Five-foot Mill, \$1,500.00
Weight, 24,000 lbs.

SEND FOR CATALOGUES AND DISCOUNTS

C. P. Acids

A Complete
Line of
Drills

UPRIGHT DRILL

THAT ARE MADE BY
W. F. & JOHN BARNES CO.,
105 Ruby Street, Rockford, Ill.
ARE SOLD IN
San Francisco by
HENSHAW, BUCKLEY & CO.

Why SEND YOUR MONEY EAST FOR

Shoes and Dies, Cams Tappets, Car Wheels, Shafting, Hangers, Pulleys, Ore Cars and Iron and Brass Castings, when they can be obtained for the same price and in less than half the time

AT THE

Albuquerque Foundry and Machine Works,

Repairing of Mill and Mining Machinery a Specialty.

Albuquerque, New Mexico

Advertise your ...

* WANTS *
In THE JOURNAL

I. C. YAWGER,
SUCCESSION TO
VICTOR BISHOP & CO.

**MACHINERY**

NEW AND 2ND HAND

FOR SALE CHEAP
Hoisting Engines, Air Compressors, Rock Drills, Crushers, Dump Cars, Steam Shovels, Light Locomotives, Relying Rail, etc. Send for printed list just issued.

WILLIS SHAW, 629 N.Y. Life Bldg., CHICAGO

Reliable Assays

Gold	.....	\$ .50	Copper	.....	\$ 1.00
Silver	.....	.40	Gold, Silver and Lead	.....	1.25
Gold & Silver	.....	.75	Gold, Silver, Copper	.....	1.50
Lead	.....	.50	Gold, silver, copper, lead	.....	2.00

Samples by mail receive prompt attention.
Highest price paid for Bullion.

Ogden Assay Co.,

Denver, Colo.

UNFAIR COMPETITION

Our recent announcement that inferior goods had been sold and billed on the Coast as our goods, and that our trademark numbers had been counterfeited, has disclosed an even greater extent of these practices than we had supposed to exist. To make the resulting damage to the reputation of our goods as small as possible and to protect our would-be patrons we repeat:

All our catalogue goods, except those listed by us as manufactured by others, are stamped with our name "Keuffel & Esser Co." or our initials "K. & E. Co." and where there is room for it, with our trademark. Our German drawing instruments bear only the trademarks  or  only, and goods so stamped are therefore not ours. All our goods are fully warranted to conform to the description we give of them in our catalogue and to be of the quality and grade specified. We make some lines of cheaper goods for the jobbing trade, but they differ from our catalogue goods in quality and appearance. These inferior goods are not stamped with any of our trademarks. Our catalogue goods are not furnished to any dealer or agent without our complete stamp as described above, and any claim that we furnish our catalogue goods by special arrangement without our stamp is therefore an attempt to deceive. Our special papers in rolls or sheets

Duplex Universal Anvil Paragon Normal

are watermarked or stamped along the edge with their name. Any claims that our papers are furnished by us in bulk without these names or that these papers have been obtained otherwise than through us, are absolutely false. We will thankfully accept any information bearing on the counterfeiting of our trademark numbers or the palming off of other goods as ours.

Very respectfully, KEUFFEL & ESSER CO., New York

**LINK-BELT Elevators and
Conveyors**

Electric Coal Mining and Haulage Machinery.

Complete Tipple-house equipment, Coal Washing Machinery, Shafting, Pulleys, Shaft Bearings, Friction Clutches, Gearing, etc.

SEND FOR CATALOGUE

The Link-Belt Machinery Co.

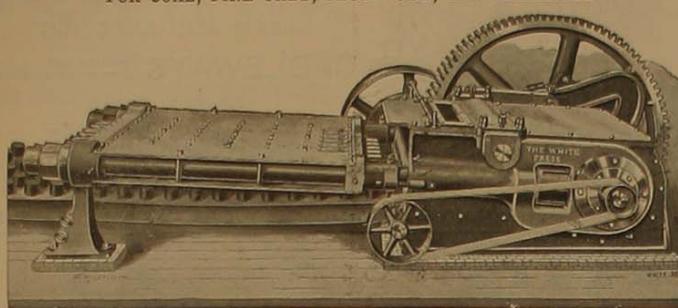
ENGINEERS, FOUNDERS, MACHINISTS

CHICAGO, U. S. A.

DENVER:
1328 17th Street
A. E. LINDROOTH, Manager

The White Briquetting Press

FOR COAL, FINE ORES, FLUE DUST, CONCENTRATES



SOLE LICENSEES TO SELL AND OPERATE

The Henry S. Mould Company,

Carnegie Building

PITTSBURG, PA., U. S. A.



The Gold and Silver Extraction Co.
OF AMERICA, Limited

Capital \$550,000

The Original Cyanide Process. Simple, Reliable, Economical
Mine owners and others having Refractory and Low Grade Gold
and Silver Ores and Tailings should have their material tested by
THE MACARTHUR-FORREST PATENT CYANIDE PROCESS
Samples assayed and fully reported upon. Properties examined.
Designs furnished. Particulars upon application.
GEO. A. ANDERSON, Gen. Mgr.

210 McPhee Building, Denver, Colorado

Information, estimates, etc. cheerfully given. JESSE J. MACDONALD, Agent,
Care B. M. Calkins, 127 W. 1st St., Los Angeles, Cal.

Miners Attention!

We Sell Powder, Caps, and Fuse, **Mining Machinery**, Belting, Asbestos Goods, packing of all kinds, Picks and Shovels, Iron and Steel; Iron Wheelbarrows, Ore Sucks, Tents, Portable Forges and General Mining Supplies. Agency Truax Mfg. Co and Studabaker Wagons.

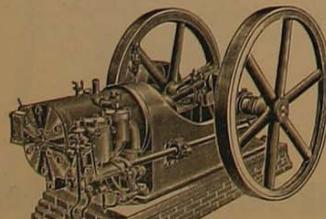
WILCOX & ROSE CO.,

San Bernardino, Cal.



LAMBERT

Gas, Gasoline and
Distillate Engines



TANKS, PIPE and WATER
SUPPLY GOODS PUMPS
of all kinds.

Call on or Address,

S. J. Smith,

230 E. Fourth Street,

LOS ANGELES, CAL.

ESTABLISHED 1820
YOUNG & SONS.
Manufacturers of

Engineering, Mining and Surveying Instruments
Noted improvements in Auxiliary Telescopes
for vertical sighting in mines. Makers of the
inclined standard transits. Non Extension
Telescopes, moisture and dust proof. Write for
special circulars of mining transits.
43 N. Seventh St., Philadelphia, Penn.

SAVE MONEY! FUEL COSTS MONEY

Protect your pipes and boilers with Wm. Berkfeld's
Fossil Meal Co.
2 Cedar Street, New York

Assay Office
LEWE, AUBURY, E. M.

115 West 1st Street,
Opp. Natick House LOS ANGELES, CAL.

Mining Supplies and Steel

Blacksmiths and
Machinists Supplies
of all kinds.

Iron and Heavy Hardware, Wood
Materials, Wheels, Hardware &c., for
heavy freight wagons. Blacksmiths
and Wagonmakers Tools and Ma-
chines. Send for complete catalogues.

S. D. KIMBARK,

80-82-84 Michigan Ave., Chicago, Ill.

W. O. ABBOTT, ASSAYER

ASSAYING IN ALL ITS BRANCHES
CHEMICAL DETERMINATIONS ACCURATELY MADE

TOMBSTONE - - - - - ARIZONA

See those wires--how they Interlock? Note the smooth surface also.



No Displacement of Wires in any event. * Gives three times the service of other cables and
adds correspondingly to the life of the rolling stock.

— THE PATENT —

LOCKED-COIL TRACK TABLE

IS USED ONLY ON THE PATENT

Bleichert Wire Rope Tramway

AND OTHERS, MANUFACTURED BY

THE TRENTON IRON COMPANY, Trenton, N. J.

— ENGINEERS AND CONTRACTORS —

And Sole Licensees in North America for the Bleichert System. Also, Wire Rope Equipments
for Surface and Underground Haulage, Transmission of Power, etc. Illus-
trated book upon application

For Particulars, address, NEWTON M. BELL, Agent, 109 CALIFORNIA STREET,
SAN FRANCISCO, CAL.

See Incorporated Mines Paying Dividends Page 22

WM. M. COURTIS, A. M.

★ Mining and
Metallurgical Engineer

Assayer and Analytical Chemist

Office: 412 Hammond Building,
Permanent Address, 449 4th Ave. Detroit, Mich.

Assay Office and Ore Testing Laboratory

OF HENRY E. WOOD, Assayer

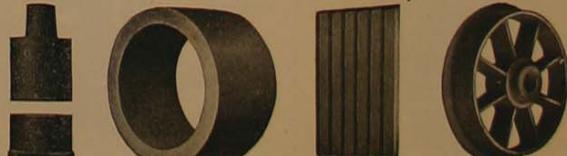
1734 ARAPAHOE ST., DENVER, COLORADO

Established in Colorado in 1876

Control and Umpire Assays a Specialty. Williley
Concentrator in Operation. Write for circular
giving prices, etc.

HADFIELD'S MANCAÑESE STEEL,

HARD,
TOUGH.



Best Metal known for Stamp Shoes and Dies, Roll Shells, Crusher Plates and Side Liners, Toggles
and Toggle Bearings, Gyrotary Cones and Concaves or Liners, Mine Car Wheels, Coal Crushing
Rolls, Etc., Etc.

TAYLOR IRON AND STEEL CO.,

Sole Licensees in America under Hadfield System and Patents. HIGH BRIDGE, N. J. U. S. A.
All Pacific Coast parties interested please address, Faile & Lacy Co., San Francisco, Cal.

The Mining And Metallurgical Journal

ENTERED AT THE POST OFFICE AT LOS ANGELES, CALIFORNIA
AS SECOND CLASS MAIL MATTER.

VOL. XXI. JUNE 15, 1899. NO. 6.

F. W. EDELSTEN, Editor.

O. S. BREESE, Business Manager.

JOHN STEWART, Special Contributor.

ULRICH KNOCH, Publisher

MAIN OFFICES

Stimson Block, Los Angeles, Cal.

150 Nassau St., New York, N. Y.

BRANCH OFFICES:

San Francisco, Cal.	64-65 Merchants Exchange
Chicago, Ill.	413, 59 Dearborn St.
Denver, Colo.	402-403 Quincy Bldg.
Salt Lake City, Utah	15 W. Second South St.
Spokane, Wash.	Hypotheck Bank Bldg.
City of Mexico, Mexico	No. 4 Calle de San Juan de Letran

SUBSCRIPTION PRICE:	
For United States, Mexico and Canada	\$2.50 per annum
" " "	1.25 six months
All other countries in the postal union	3.50 per annum
" " "	1.75 six months

NOTICE TO SUBSCRIBERS.

Subscribers not receiving their copy of the JOURNAL regularly, whether ordering through agent or direct, will kindly notify the Los Angeles, Cal., office.

ISSUED SEMI-MONTHLY

ADVERTISING RATES FURNISHED ON APPLICATION.

A MINING CONFERENCE.

Under the above heading the Los Angeles *Daily Times* of the 6th inst. starts out in true Parson-like style and prints soft words of praise of the recent mineral development in Southern California, and says that the needs of the "Times" "has led to a demand for the formation of a solid miners' association, "to which those engaged in developing the "mineral wealth of the southwest may look "for assistance and advice." For the information of the *Times*' weekly mining editorial writer, the fact is mentioned that on the 29th of April, in the Chamber of Commerce Hall, in Los Angeles, such an association was duly organized in the name of the Southern California Branch of the California Miners' Association, and the success of that meeting has caused the majority of those who attended it, and many others who could not attend the meetings for business reasons, to add their names to the list of members. There are many good motives why the formation of a miners' association should be a State organization, and not a little local affair having no affiliations with the already prominent and influential California Miners' Association, for the *Times* goes on to say that:

"The idea is a good one, and should be taken up by mining men in this section. Such an organization could co-operate with the San Francisco association on matters which relate to the general welfare of the mining industry." That is just the point. The miners of the southern counties desire and require to be heard at the meetings and deliberations of the California Miners' Association, but do not go altogether "for assistance and advice," as suggested by the *Times*, but to represent the Southern counties in matters which affect their interests, and to give assistance and advice in matters which require a knowledge of Southern California conditions, and also that representation which they require. The formation of a small local association would not give to its members that co-operation the *Times* considers desir-

able, as there already exists the Southern California Branch of the California Miners' Association, which "Parsimonious" reasons alone, prevents a few from joining, as they are afraid it might benefit somebody else. The most influential mining men in the southern counties have already seen the benefits to be derived from union of the whole mining interests of the State, and are members of the Southern California Branch of the California Miners' Association.

ARCHITECTURE AND MINING.

A very important part in the successful operation of a mine is the plan or arrangement of the surface buildings. As no two locations in metallic mines are the same, this class of mining has that feature strongly marked, when compared with coal mines, at which the surface is generally on level ground or a hill side, consequently, it requires more experience in mining architecture to successfully install an economical and easily operated plant for the reduction of ores, at the lowest possible cost the circumstances will permit, than it does for washing and screening coal. The first object to keep in view is to have the mill or crushing and concentrating plant as near the mine shaft or tunnel as circumstances will allow, but separate from the shaft house, in case of fire in the mine. The next is to have the building placed at a lower level than the mine, so as to take advantage of the force of gravity in transporting the ore, and thereby avoid hoisting. It is in these two points that inexperience is sure to make itself prominently apparent, until a change for the better is made.

A company owned some twenty or more claims situated in a range of hills, which took the form of a horseshoe, with a flat or valley in the center, the drainage from which having made a channel or dry creek some fifteen or twenty feet deep, and on the bank of the dry stream, and in the middle of the flat valley, at a point about a mile from the shaft, a forty stamp mill was constructed. It required but a short time for the dry bed of the creek to get full of tailings, which accumulated up to the level of the sill plates of the mill, and of course then the tailings had to be hoisted. Inexperience prompted the architect of this plant to build the mill at a central point equally distant from all the claims, just as a church would be built in the center of a town or district. But the ore before it went into the mill and after it came out was not self-transporting like a church congregation, so it had to be hoisted from the mine, run down to the mill, a mile distant, then hoisted again, and the tailings again hoisted. Whereas, with a mill at the shaft, one hoisting would have been sufficient. With all the unnecessary handling of the ore this mine paid a profit, and recent improvements have established a mill on higher ground near the shaft.

NEW GOLD FIELDS.

The recent discovery of rich placer ground at Santa Clara, in the Sierra Pintada, some twenty miles from San Roque, in Lower California, and 300 miles from San Diego, California, of which notice was taken in the last issue, is still attracting attention in the daily press. As a result of these reports, all available means of transport by vessel from San Diego have been made use of by the ever-ready optimistic class of prospectors when rich placers are talked of.

There is no doubt but that in Lower Cali-

fornia, Mexico and South America there are much better opportunities of being successful in the search for gold, both in districts already known, and with the possibility of discovering new ones than the prospector has in the wilds of ice bound Alaska and the North West Territories. Then, again in Mexico and South America the mining laws are more just, and are framed to encourage mining, while in the North West Territories, the government is foreign to Americans, and the laws restrict the limits of a claim to small area, and only one claim at that.

The South American Republics, and the newly acquired possessions of Cuba, Porto Rico, and, in the near future, the Phillipine islands, offer to the American prospector, mining engineer and capitalist a much larger and better field for discovery and investment than the slow rate of development which it is possible to accomplish in a northern climate, where the ground is frozen all the year, and the resources of the country consist for the most part of danger to life and misery as long as one is in the inhospitable region.

As the gold in warm climates, such as South America, is found in the mountain districts, the unhealthy condition of the lower rivers and the coast do not threaten the health of the prospector as much as the vicissitudes of life in the far north entail on the health and constitution of those who have spent winters in that region, and are now known to us as Klondike wrecks. The south is certainly the largest and most inviting field.

HOISTING MADE SAFE.

As a means of decreasing the liability to accidents while hoisting, the use of an indicator is a valuable addition to a mine hoist. The general practice is to have such auxiliary appliances attached by gearing to the drum of large hoisting engines, but their use ought to be more common in the case of small hoists. In all mines where the employes or material are hoisted, or lowered into the mine shaft by cage, skip or bucket, there should be a target or indicator to mark the exact location of such load. The dial or slide of such an indicator, when placed in clear view and near to the engineer, is the best guide for him to go by, in regulating speed or stoppage. Any means that correctly aids the driver of the hoist in observing the position of the load makes his duty less burdensome or fatiguing to the mental strain produced by attending such work, and decreases the chance of accidents. The attention of manufacturers of this class of machinery is called to this point, and mine owners and superintendents cannot err in placing such a preventive to accidents on the mine hoists, if not there already.

MILLS AND MILLMEN.

In looking back over the visits to so many mills, in localities so essentially unlike, it is impossible not to realize that the variations in milling are as nothing compared to the variations in mankind. The gathering of data, by means of inquiry and observation, is an undertaking the pleasure of which is too often swamped by the labor consequent upon the drawing out of information from persons unwilling or unable to give it. Much as technical science has made itself at home in every Anglo-Saxon community, there yet remain many who cannot comprehend the gathering of knowledge for its own sake, and

only too often the inquirer is received with a suspicion which is annoying as it is detrimental to the objects of his pursuit.

In gathering data at the various milling plants, it is found, as a rule, that the establishments which were the most systematically conducted were the readiest to grant the information required; that the most refractory were the most ignorant of what they were really doing, and that in the latter case frequently the questions asked are such as the mill manager himself has never put to himself, and to which therefore he could not reply without realizing, and for the first time, what he actually was doing.

The differences between the abilities of millmen and the management of mills would be absurd were it not depressing. It is depressing because there seems to us to be no excuse for consigning the handling of an ore-reduction establishment to the hands of a carpenter or miner; it is depressing because it appears such a blunder to exercise all skill and judgment in the mining of the ore, and then to overlook the importance of the subsequent proper extraction of its valuable contents. That such things should be is due to the fact that the stamp mill is usually considered a very simple mechanism, capable of regulation by almost anyone. The apparent simplicity of the treatment has prevented technical men from making it the study it deserves and invites, and all the more so since, in spite of the encroachment of other and more intricate processes, the stamp mill seems to be destined to a career of further long continued usefulness.

It is indeed true that fire processes are encroaching on wet methods, more particularly in the case of complex ores; it is also true, per contra, that chlorination, cyanidation, and other leaching processes are actively competing for the millstuff which might otherwise go to the battery, yet it will generally be found that the diversion to the other reduction works of ores suitable to stamp milling is comparatively slight, and confined to such ores as are essentially unadapted for amalgamation.

The simplicity of the machinery for stamp milling, its long proven adaptability to various docile ores, and the noteworthy cheapness of the treatment, render it pre-eminent among metallurgical methods of gold extraction. We hear continually of new inventions for the rapid pulverization of ore and the easy extraction of its contained gold. New processes are born daily, but their mortality is very depressing.

It may be that some heaven-sent revelation may some day enable the metallurgist to extract 100 per cent of the value in an ore at a cost insignificant when compared to the magnitude of the result, but we may well have grave doubts. The story of metallurgical progress proves it to have been evolutionary and not revolutionary. It is by the gradual improvement of established methods rather than by the sudden application of new and untried processes that success is soonest attained and longest maintained.

The record of the chlorination process in America affords an instructive illustration. Although employed at Grass Valley, California, as early as 1857, it has taken nearly 40 years to bring the knowledge of the best methods of its application to such a stage as to render its use technically successful and economically safe. From the slow and simple practice first borrowed from Plattner, it has passed through many changes until today, in the improved barrel process, it has taken

hold upon a certain part of the metallurgical field. Cyanidation, on the other hand, illustrates in a marked manner the earlier struggles of all leaching methods, and its checkered career is one commonly shared by delicate chemical processes of ore reduction in course of successful evolution from uncertain beginnings.

MINERALS UNDER AGRICULTURAL LANDS.

Under our present laws the minerals on patented lands are owned or pass to the owner of the surface rights, when that land is patented under the homestead, timber or other laws. By that means in the past, and the evil is still being continued daily, the Federal Government has and is now creating the worst class of monopoly of the minerals of the country by deeding the minerals along with the surface rights. It is true that a pretence is made to inquire into the character of the land before it is patented by asking the claimant if it is mineral in character, but there the farce is completed and the official conscience is quieted of all responsibility to conserve the interest of the miners of the country, whose portion is given as a gift along with the surface rights to land or timber. Under this unjust system industry is retarded, for nearly every one knows that it is useless to make a mining location on patented land. The records of the courts of law in cases of dispute of this kind are so numerous that the enormity of the crime committed in giving the miners' birthright to another party for nothing is made clear beyond doubt. The extent of mineral territory in California which has passed under title of Mexican grants, homesteads and timber land patents, into the hands of parties who will not work them and who prevent others from doing so, has created a trust or monopoly of gigantic size of almost half the minerals of the State. It is the proper sphere of the State Miners' Association to take the matter in hand and have laws passed by which all the minerals in the State shall be made available for mining purposes by granting to the surface owner compensation for all land used or occupied in mining or quarrying occupations, by the party who desires to operate them. In other southwestern States, the minerals situated on Mexican grants have been by Federal laws made open for location, and had these lands now in California continued in Mexican control, the rights of the miner would have been respected and the minerals would have been reserved for his use.

CURRENCY REFORM.

Just before Congress adjourned, the Republican members of the House of Representatives held a caucus at which a committee was appointed to devise a plan for monetary legislation at the session of Congress which commences on the first Monday of December next. That committee has had a meeting at Atlantic City, New Jersey, and as reported, has agreed upon a program so far as the currency feature is concerned.

The first proposition is that all obligations of the government shall be redeemed in gold.

While the language as reported is very broad, we can hardly suppose that the silver certificates shall be redeemed in gold, as the contract is specific that they shall be redeemed in silver, yet the theory of Secretary Gage is that silver shall be put on a gold

basis through some plan he intimates that he has in mind, but which he has not promulgated in detail.

The second proposition is that when the greenbacks are taken in, they shall not be re-issued except for gold. The effect of this will be to rapidly retire government paper, for the law is such that customs duties and internal taxes can be paid in such money, and doubtless much of them will be so paid. While paper money is a convenience, it is hardly to be expected that people will take their gold to the treasury for the purpose of getting paper, but will rely on the use of bank notes. As the law now stands, government can put out greenbacks and treasury notes in payment of current expenses, and if the proposition as reported is enacted into law, that cannot be done. The country may therefore look for a contraction of the currency to the extent that government notes are used in paying duties and taxes.

It is probable that the committee presumes that this contraction will be offset by increased issuance of banknotes, and hence its third proposition is that the banks may issue to par of their deposited bonds instead of 90 per cent, as the law now permits, and also authorizes the establishment of banks at small towns with a capital stock of \$25,000 instead of \$50,000. If the banks should issue the additional ten per cent, the increase of circulation would be only about \$25,000,000, and the extent to which new banks will be established can only be conjectured.

The revenue of the government is in the neighborhood of \$480,000,000, and if 25 per cent is paid in greenbacks and treasury notes, they would all be taken in in about three and one half years, causing a contraction of the circulating medium to the extent of \$120,000,000 per annum, less whatever sums might be reissued for gold.

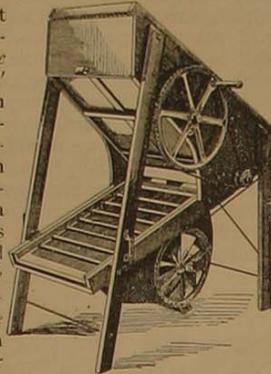
The third proposition, so far as appears, leaves banknotes secured by government guaranty, and the government secured by deposit of its bonds. This is not what Mr. Secretary Gage and the Bankers' Alliance want to have done. Their scheme is to have the banks so organized that note holders will have no security except the assets of the banks. National banknotes have had the confidence of the people because the government stands behind them, and for that reason they have been circulable in every part of the country without question. It may be apprehended that the program of the committee is the first step in the direction of the plan of Secretary Gage and the Bankers' Alliance. They touch the subject lightly to avoid too much opposition at the outset, and so near another presidential election.

The silver feature of the money question has not been touched by the committee so far as reported, and for the reason, doubtless, that it was deemed inadvisable to be too radical in the revision of the money system. If what the committee has reported is all that is to be done, coinage of silver dollars will go on to the extent of \$18,000,000 per annum. Revision to the extent proposed will not satisfy the friends of silver, nor the extreme goldites. That there will be some monetary legislation at the next session of Congress can scarcely be doubted. The friends of gold and extended banking privileges will force action to some extent on the line of their wishes. The Republicans have possession of the whole legislative power of the government, and they will not be permitted to let matters drift. It is a political necessity that they should do something.

The Mait Dry Gold Saver.

The Mait Dry Gold Saver was invented and patented by a man who has followed mining in California since the early 50's and is a thoroughly practical dry washer. It received the first premium at the Agricultural Fair 1897 in Los Angeles, Cal., over some dozen competitors and has been used in Southern California at various mining districts with success invariably.

The sand, dust or gravel is shoveled in a dry state through a $\frac{3}{4}$ " mesh iron screen into the top reservoir or hopper, the bottom of which is provided with a number of slats that are opened and closed by means of a damper, thus the discharge from hopper to lower screen is regulated by hand.



From the hopper the material drops onto the upper end of the inclined lower screen, which receives a rapid "up and down" motion by an eccentric and a steady air blast from below by means of two fans, running from 500 to 600 revolutions per minute. The screen is provided with five galvanized iron riffles, also two riffles for nuggets on hopper screen, is made of the best 70 mesh brass wire, mounted on a hardwood frame, and on it every particle of gold, fine or coarse, is caught.

By turning the crank on the large sprocket wheel, the operator furnishes the necessary blast and gives motion to the screen.

After a run of about 1000 lbs. of material, the lower screen is lifted off its place, and its contents are dumped on a tarpaulin—operation is then resumed as before. On completion of a day's run, the concentrates thus collected on the tarpaulin are sent through the machine once more, and the result will be about a pint of sand and gold. To clean this up, the lower screen is removed entirely and the stuff dropped slowly between the two moving fans, thus ridding itself of nearly every particle of sand. Care should be taken not to blow too hard on this final clean-up, and the gold will be found, mixed with but very little sand or gravel, in a little drawer, located at the extreme bottom of the machine.

The material of its construction are the best and well bolted and screwed (not nailed) together, is easily taken apart the wood work is made of spruce and popular casting are made of iron and brass, while lining is made of a heavy quality of galvanized iron.

Latest Mining Decisions.

Prepared by Andrews & Murdoch, Berrien Springs, Mich.

A court having obtained jurisdiction of all parties to an adverse suit for possession of a mining claim may grant full relief and restore possession to the party entitled thereto. Silver City Gold & Silver Mining Co. vs. Lowry et al., 57 Pac. Rep. (Utah) 11.

A deed conveyed the right to enter on land for mining purposes only and to prospect and mine the same, "if (the grantee) should discover any gold in quartz suitable for mining."

Held, that the quoted clause was not a condition subsequent. Woodside et al. vs. Ciceroni, 93 Fed. Rep. (U. S.) 1.

Lessees of mining ground in possession, who oust their lessor by relocating the ground, and setting up an adverse title in themselves, forfeit all rights under the lease. Silver City Gold & Silver Min. Co., vs. Lowry et al., 57 Pac. Rep. (Utah) 11.

A grant to the right to enter on land for mining purposes only, and to prospect and mine the same not being exclusive, the grantor and his subsequent grantees also, had the right to prospect and mine on the same land. Hence no presumption could arise of abandonment of the rights first granted, from the fact that similar rights were exercised by the grantor and his subsequent grantees. Woodside et al. vs. Ciceroni, 93 Fed. Rep. (U. S.) 1.

While one who willfully and intentionally takes ore from another's mine is not entitled to deduction from the value thereof for labor bestowed where the taking was inadvertent, and under an honest mistake as to the ownership of the land only the value of the property in its original place can be recovered. Durant Min. Co. vs. Percy Consol. Min. Co., 93 Fed. Rep. (U. S.) 166.

In the first part of a deed there was a bargain, sale and conveyance of the right to enter upon land for mining purposes only, and to prospect and mine the same. Then followed a provision that the prospecting and mining should be done with as little damage as possible. It was then provided that, "for the purposes aforesaid," a right of way was granted across the land, which was then described; and following the description, without break or punctuation, were the words, "together with the mines of gold therein contained." *Held*, that the last-quoted clause was a part of the description, and not a grant of the mines. Woodside et al. vs. Ciceroni, 93 Fed. Rep. (U. S.) 1.

Where the original discovery of a vein upon which a mining location is based is included within the surface of boundaries of a junior location, which goes to patent without protest from the owners of the prior location, but before such patent a new discovery has been made on the prior location, without the boundaries of the junior location as patented, and within the surface boundaries of the prior location as originally located and development work is being there prosecuted in good faith by the owners of the prior location, their claim is valid, and holds as to all ground not included in the patent of the junior location, notwithstanding the loss of the original discovery. Silver City Gold & Silver Min. Co. vs. Lowry et al., 57 Pac. Rep. (Utah) 11.

An ancillary to an action at law, the owner of a mine filed a bill for injunction against one claiming the right of possession; and defendant was enjoined not to operate the mine or interfere with the mining property, or commit trespass, waste or nuisance. Subsequently an agent of defendant in charge of the premises turned them over to complainant. Complainant afterwards extended a tunnel for the purpose of performing the annual assessment work, the ore so extracted remaining on the dump; and, to avoid forfeiture of a policy of insurance covering a quartz mill, complainant kept a watchman on the premises. *Held*, that the acts of complainant tended to the ground that complainant had abused the process of the court in doing the acts which it had caused defendant to be restrained from doing. Silver Peak Mines vs. Hanchett, 93 Fed. Rep. (U. S.) 76.

The American Impulse Wheel Co., of New York, have lately installed a 36" water wheel in the Boston Institute of Technology, and the first test which has just been made, before bearings are smooth, etc., shows over 80 per cent of efficiency, and the whole water engine, in design and finish, is highly satisfactory, adding only another testimony to the many that this company have regarding the water wheels manufactured by this company.

The Jeffrey Manufacturing Co. of Columbus, Ohio, have issued a catalogue on Jeffrey Coal Mining Machinery, with a desire to draw the attention of the coal operator to machinery which is being manufactured by the Jeffrey Manufacturing Co. A short description accompanies each design. There are eighty pages in the book, clearly printed and well written. Send for Mining Department Catalogue No. 16.

The Little Alaska Gold Washer.

Not much has been heard from the manufacturers of this machine in the past year on account of a difficulty in obtaining their patent. In February 1898 the machine was attracting considerable attention, and when taken to Seattle, Wash., set that place wild with enthusiasm. Although a patent had been applied for at the time some dozen or more unscrupulous persons began the manufacture and sale of them in that city. About 600 machines were sold in Los Angeles, Cal., in the early part of 1898 and about 1000 sold in Washington, by the inventor, to say nothing of those made and sold by parties who had no right to do so.



The name The Little Alaska Gold Washer was given by the inventor chiefly on account of its great adaptability for its use in Alaska. But it has been used in all parts of the country wherever placer mining is found.

A brief description will suffice to convince any one at all acquainted with the laws of gravity, that the machine is built upon scientific and practical lines. The idea of working is to give the pan a rotary motion, back and forth, and any substances thrown in will first be brought to the center, by the action of turning, then by a long whirl of the pan be thrown out, and any gold of its own weight will remain in the hollow cup at the center, from which it is absolutely impossible to dislodge it.

This rotary motion is accomplished by having a rod run from the base into the hollow stem under the pan, thus allowing it to turn freely. The handle at the top of the upper stem gives the operator a firm hold. In the center of the pan, securely riveted to it, is a cast cup of such a shape that it is impossible for the metals to be dislodged from it.

The weight is also a great factor to be considered, while other machines weigh from 50 to 200 pounds, and require two or more men to work, The Little Alaska Gold Washer weighs $7\frac{1}{2}$ pounds, one man can work it and shovel at the same time, which is an advantage over a dry washer.

The amount of dirt this machine works in a day is only limited by the man handling it.

This machine is not a dry washer, but it can be used with very little water. There are hundreds now in use in localities, where water costs from one to three dollars per barrel and has to be hauled many miles.

CHLORIDE, ARIZONA.

From a letter received in Los Angeles, Cal., by William E. Savage, the Land and Mining Attorney, we were permitted to take the following:

"In giving the information you ask, I will confine myself to facts and statistics. Chloride is in Mohave county, Ariz. The mines of Wallapai district are in a mineral belt about fifteen miles in length, and four or five miles wide, running from Chloride on the north to Cerbat on the south. The formation is granite.

"I will name some of the leading properties, the owners, managers, etc.

"The Merrimac is situated on a flat, one mile northwest from town, and is owned by Cleland Bros. & Cochran of Philadelphia, J. M. Russell manager, Eli Hiltz superintendent. The deepest works are 375 feet. The first class ore is worth \$1000 per ton. They are doing development work at present, with fine ore in the bottom.

"The Juno is three-fourths of a mile north of town, has produced many thousand dollars. Some car lots of ore run as high as 500 ozs. silver, \$10 gold and 50 per cent lead per ton. The owners are sinking a shaft, present depth 150 feet. E. T. Loy manager.

The Tennessee is the leading mine at present. Their main shaft is 310 feet deep. A 120-ton capacity mill is in operation, concentrating the ore, which is a galena carrying an average value of 60 per cent lead, 25 or 30 ozs. silver, and \$2 to \$10 per ton gold. The last 100 feet of sinking has been in solid ore. At present no one knows the width of the ore vein. At points nearer the surface, cross cuts have shown 20 feet wide of ore. This property is incorporated. E. T. Loy is manager.

"The Elkhart is on the same vein as the Tennessee. The main shaft is 382 feet deep, with the bottom in big ore—lead, gold and silver. A mill of 150 tons capacity is running half time—water scarce. Thos. B. Comstock is general manager.

"The Connor-Minnesota group, owned and managed by John Barry, is one of the great mining properties of northern Arizona. The deepest workings are 200 feet. The ore runs high in gold and silver. More than half a million dollars has been taken from the shallow works. I have seen 16 feet wide of ore in the Minnesota. The property is situated one and one half miles southeast of town.

"The Rainbow is near the summit of the Cerbat range of mountains three miles from Chloride. Its deepest works are 125 feet. It has produced \$75,000—ore gold, silver and lead, gold predominating. It is being developed by tunnel, and is owned and managed by A. M. MacDuffee.

"The Lucky Boy, near the Rainbow is owned and being worked by John Smithline. It is about 100 feet deep and produces rich ore in regular shipments.

"The Samoa, owned by Mr. F. P. Ar buckle and Governor Thomas of Denver, Colorado, is partially developed and has produced many cars of ore running from three to five ounces gold, and 300 to 400 ounces silver per ton. At present it is being worked by John Leng, who has a lease on the property.

"The Midnight is destined to make a great mine. It is owned by the St. Charles Bros., who are sinking a shaft which is something more than 100 feet at present, and is being sunk three feet every twenty-four hours. The vein is, in places, 35 feet wide and has eight feet of solid ore running high in copper, besides a good value in gold and silver. At a

depth of 200 feet they will drift on and cross-cut the vein. Mining men of this section are watching results of development on the Midnight with much interest.

"The Payroll, situated between the Tennessee and Connor-Minnesota, is an immense vein, forty feet wide in places. It is a concentrating proposition, value chiefly gold, with a good percentage of lead and silver. A shaft 5x9½ feet in the clear is being sunk.



TENNESSEE DUMPS. CHLORIDE IN BACKGROUND.

The manager, Collin Timmins, a practical mining man from Colorado, tells me he will sink 60 feet as fast as possible. The Payroll has great possibilities.

The Mollie Gibson, lately purchased by Carter & Co., of Butte, Mont., managed by Thos. Grant, is a high-grade lead ore, carrying high values in silver, masses of wire and ruby silver showing in the galena. The company are now placing a steam hoist on the property, preparatory to deep work. It is said the company will sink 600 feet as fast as men and machinery can do it.

"Space is too limited to describe all the properties with merit in this section. I will give the names of a few of the most promising claims, and the owners or managers.

"Altatta, Cross Bros.; Queen Bee and Keystone, James Uncapher; Home Pastime, Joe Prisk; Lone Star, J. P. Finegan. (This property deserves more than passing mention. I was past it a few days ago, and they were hoisting lots of ore fairly red with ruby silver, and spotted with 'wire' and 'native.' Some of this ore will work 1000 ozs. silver and eight to ten ozs. gold per ton.)

"To the south of Mineral Park are dozens of mines that have produced from one hundred thousand to a million dollars each. Some



TENNESSEE MILL, CHLORIDE, ARIZONA.

of the most noted are the C. O. D., John Lynch owner; Night Hawk, Geo. M. Bowers manager; Cupel, —; Prince George, —; Oro Plata, J. G. Geritt; Eureka, Tub Ayers owner.

"There are many other claims of prominence, the names of which I do not recall just now.

"This has always been known as a 'poor man's country. Many a poor man has made

a little stake of a few thousand dollars, taking out ore near the surface, which was shipped to the smelters in Colorado. Millions of dollars have been produced from these shallow workings. (The deepest shaft in the district does not exceed 400 feet.)

"I have been situated in and around Chloride thirteen years, working mining properties and doing more or less assaying all the time. I am acquainted with ALL the mines and the owners of them, and have shipped great quantities of ore myself, therefore I am in a position to know whereof I speak regarding this district, which is the most highly mineralized region I have seen in my 26 years of mining experience, during which time I have traveled over thousands of miles of the Rocky Mountains, including much of Old Mexico. Should there be any further information required, I would be pleased to accommodate you at any time.

Yours truly, A. M. MACDUFFEE.
Chloride, Ariz., May 26, '99.

A New Telluride Mineral.

Colorado has added another new mineral to the telluride species. Professor William H. Hobbs of the University of Wisconsin, who made the analysis and crystallographic examination, has named the mineral Goldschmidite, after Professor Victor Goldschmidt, of Heidelberg.

It is related to sylvanite, and occupies an intermediate position exactly half way between calaverite and sylvanite.

Its composition is represented by the formula Au_2AgTe_6 . Analysis gave gold 31.41, silver 8.95, tellurium 59.64. The tellurium was estimated by difference. It belongs to the monoclinic system of crystallization, and exhibits no less than twenty-two crystal forms. Crystallographically as well as chemically, goldschmidite shows affinities with sylvanite, ten forms being common to the two minerals. The luster of the mineral is bright metallic and the color silver white. The streak is dull, grayish black. It is quite brittle and has a hardness of about 2.

The mineral was found in the Gold Dollar mine in Arequa Gulch, in the extreme southwestern portion of the Cripple Creek district. *Georgetown Courier.*

The Colton Cement works has put in a large new rock crusher, and since then have been furnishing the Santa Fe company with crushed rock. They turn out five carloads a day, all of which is disposed of.

The company have put in a new motive power of electricity with which to run their extensive machinery. Heretofore they have used steam, but since the electric power has been put in they have been able to increase the output of cement from 150 barrels to 180 barrels per day.

The works are running now night and day steadily, employing 80 men. They say business for them has never been so good and that they have orders for all that they can put out.

An injunction suit was filed the latter part of May by the Lytle Creek Water and Improvement Company against J. C. Christy, to restrain the latter from beginning hydraulic mining operations in the canyon, thereby polluting the water, which is used for domestic and irrigating purposes. A temporary injunction was granted by Judge Day, in department one of the Superior Court.

ANTHRACITE COAL IN PERU.

(BY WILLIAM GRIFFITH, C. E., SCRANTON, PA.)
[Begin in our issue of May 15th, 1899.]

THD SOUTHERN FIELD.

The second anthracite field visited, which we have previously called the Southern Field, may be approached by the trail leading inland from the city of Trujillo on the Pacific coast, about 60 miles southward from Pacasmayo. This passes up the canyon of the river Moche to the town of Otuzco, thence over a summit to the headwaters of the south branch of the Chicama River in the Department of Libertad. It is in this latter locality along the upper Chicama that we find the coal. The waters of this stream flow to the Pacific at a point about 15 miles northward from Trujillo, and the coal fields are about 100 miles southward from the northern field previously described and about 80 miles inland from Trujillo and a little more than 100 miles from Pacasmayo. Our trail first enters the field in the valley of the stream at about 9,000 feet elevation on the westerly slope of the Andes, and we are able to follow the measures for 15 or 20 miles, and probably much further to the southeastward, to the summit of the Continental Divide, or even as far as the headwaters of the Santa River, which flows into the Pacific near the bay of Chimbote. The south branch of the Chicama is here a very rapid mountain torrent, flowing in a deep valley with sloping sides, which rise to the height of about 13,000 feet, and it is in these mountains, partly on both sides, but mostly on the northern side, that the coal is found. The strike of the measures is north 50° west, the same as the course of the stream; the average dip of the rocks is very steep, being 70° to 80° in a southwesterly direction. The coal-bearing rocks here seem to be the same sort of hard altered sandstone in which we find the coal in the northern field, although the formation is more distorted by volcanic action, which is quite evident and prominent in some portions of this southern field.

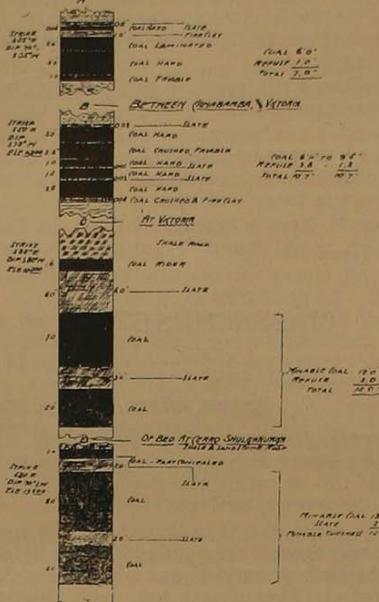
At the point where we entered the valley the coal-bearing rocks were to be found on both sides, but further to the southeastward, that is, up the stream, they occupied the flank of the mountain on the northerly side of the valley, which was more precipitous than the opposite side, which seemed to be composed

mostly of a softer formation, consisting of dark slates and shales regularly stratified, containing numerous shells of recent age, although we saw no limestone in this vicinity. We were unable to trace the existence of any regularly formed coal basin; the dip seemed to be all one way—southwesterly, and over the mountain to the southwestward of the coal measures the formation changed to the eruptive rock so common in this portion of the Andes, thus apparently breaking off the continuity of these measures to the southwest-

ward. The coal beds in this neighborhood are quite large and very prominent, and owing to the steepness of the dip, the soft material of the outcrops have been eroded by the continual rains of the wet season, thus forming

SECTIONS NEAR CANABAMBA AND VICTORIA, ON SOUTH BRANCH CHICAMA RIVER

SCALE: 1 IN.—20 FT.



long troughs or depressions, which may be easily traced. The beds seem to extend with a fair degree of continuity for a distance of at least 15 or 20 miles, and in all probability much farther. We had information of coal beds being uncovered several miles to the westward and over the divide to the southeastward, beyond the limits of the territory examined; there were numerous exposures to

the coal transported several miles to a silver works, where it is used for roasting silver ore. Other smaller beds, about 3 feet in thickness, were located about 100 feet apart lower down the measures. The principal bed, however, a measured section of which is given on plate shown herewith, section A, seemed to be a very fine seam. This bed of coal, about 6 feet thick, occurred lying between well-defined walls of hard white sandstone.

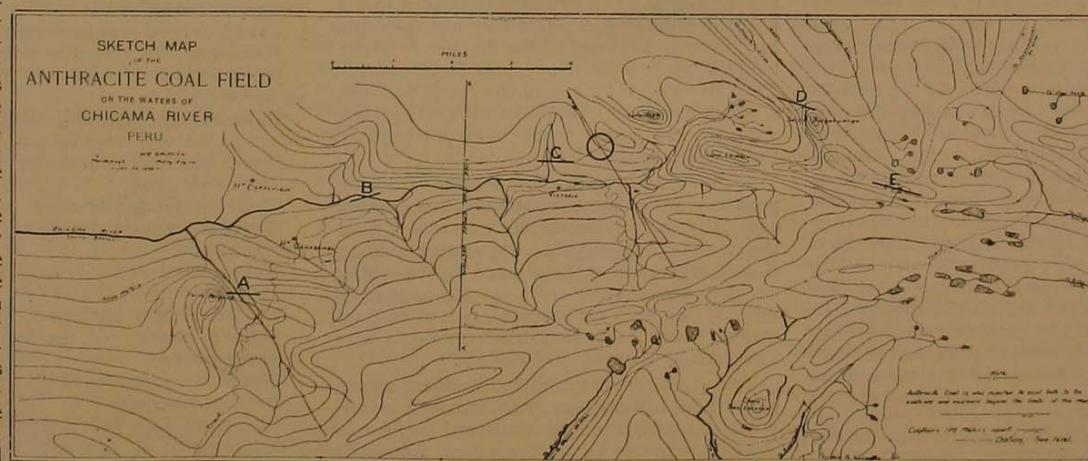
The walls were separated about 15 feet apart, and the erosion of the softer measures contained between them formed a great ditch or trough, which could be plainly seen ascending the mountain several hundred feet, and also descending and crossing the branch canyon, though the seam was evidently much thinner near the bed of the stream. This same bed was opened at another point higher on the mountain side, which was closed at the time of our visit. The coal from this latter opening was described to us as being very soft and friable, and was dug out with a shovel and carried on mule backs to the silver works, several leagues away, where it was mixed with a percentage of clay made into balls, and after drying was used in this form for roasting silver ore. This mine was said to have been driven 300 or 400 feet into the mountain side. It was near the top of the mountain, which was, possibly, the reason at this point for the crushed or disintegrated coal, or, as we would call it in the anthracite region, a dirt fault. These dirt faults are quite common in the Schuylkill region of Pennsylvania, and are expected and met and overcome in the ordinary course of mining in that field.

The second important opening was about 3 miles further up stream, close to the level of the creek. Here a fine bed of coal 10 feet thick was found, a measured section of which is shown on plate, section B. The elevation of this coal opening was about 9,300 feet, with a strike about 50° southeast, dipping 73° to the southwestward. This bed is a very fine one, being nearly all pure coal, the only

poor feature being a stratum of soft or crushed coal $2\frac{1}{2}$ feet thick. This, however, may change to firm coal at other parts of the bed. This fact, however, could only be proved by the actual course of mining:

Benches of crushed coal are quite common in the Schuylkill region of Pennsylvania, where, even in-

cluding this crushed stratum, this bed would be considered a very economical and profitable bed to work. As in the other cases noted in this coal field, the beds were enclosed by walls of hard sandstone, smooth and straight, and the ditch or trough formed between these walls at the outcrop can be traced ascending the mountain on the other side of the creek to the southeastward. Also smaller depressions indicating the presence of other coal beds of various thicknesses parallel to and both overlying and underlying this mammoth



be seen, particularly on the northerly side of the valley, many of which had been opened by the natives, who use the coal for blacksmithing, and so on. These openings were mostly confined to what appeared to be one or two mammoth coal beds opened at various points. The first of these is situated in the mountain side of the southerly side of the valley at an elevation of about 10,000 feet above tide, on a branch of the main stream.

At this point there are two or three beds visible, one of which was being mined and

bed, can be readily traced. About three miles further up the stream another opening has been made into this mammoth bed. At this point is the lixiviation plant, known as the Victoria Silver Works. The ore is here roasted by means of the anthracite coal taken from this seam. A very primitive gas generator has been constructed and the gas is used to roast the pulverized silver ore. This coal opening has been worked for some time; the bed is evidently very large and fine, as can be seen from Section C, on plate. It had, unfortunately, owing to the unworkmanlike manner of mining, caved in three days before the date of our visit; so that while we were unable to take a measured section of the bed the evidences of a very large, fine coal bed at this point were unmistakable.

We were allowed to copy the measurements shown in Section C, from the report of an English engineer who had examined the silver works at Victoria. This opening is at an elevation of 10,300 feet; also in the side of a steep canyon cut in the mountain by a small creek which flows at right angles to the strike of the seam, and empties into the Chicama, a short distance away. As far as the eye could reach on either side of the coal bed, the location of the outcrop might be easily noted by the immense gulley formed by the erosion of the outcrop. In the sides of this canyon the outcrops of other beds could also be noted, located 100 feet more or less apart, underlying the mammoth seam. The hills on both sides of the canyon are about 700 feet higher than the drift level, and the drift mouth was about 300 feet or thereabouts above the level of the Chicama.

Several other exposures or openings into this seam were noted further to the southward at various points, separated several miles apart. One of these is located about 5 miles from Victoria on the crest of the Continental Divide, elevated about 13,000 feet above the ocean. The large outcrop gives evidence of a remarkably fine bed of anthracite. It can be plainly seen enclosed between high walls of quartz sandstone, which project 20 or 50 feet above the coal and form, as in other cases, an immense ditch 40 feet in width. The coal occurs in the soft measures between these sandstones, which extend for 2,000 or 3,000 feet along the mountain side. At the time of our visit some natives were loading the coal on donkeys for transportation to a distant village for blacksmith purposes. The full section of this bed could not be measured, as part of it was concealed, but the portion exposed to view, about 18 feet, is shown in Section D on the plate shown, and discloses a remarkably fine bed of anthracite coal. The openings referred to, to the southward to this point, which were not sufficiently enlarged to enable us to take the measurements of the sections, disclosed, however, the clear anthracite coal, giving proof of the economical thickness and workable qualities of the seams.

(To be Continued.)

CORRESPONDENCE CALIFORNIA.

(From Our Special Correspondent.)

VIRGINIA DALE, SAN BERNARDINO CO.,
May 22, '99.

EDITOR JOURNAL: The new stamp mill on the Brooklyn property was completed yesterday and started up today. The Brooklyn is a very good property, and we hope to see some good bullion taken from this new mill. Ellerman & St. German's new mill on the

Ivanhoe mine started up last week, and is running day and night on some of the best ore in the camp. It is very gratifying to see these gentlemen get to pounding ore, for their property is as good as can be found in the Virginia Dale district.

George E. Kirkpatrick, of Los Angeles, has just returned to Gold Basin, to begin work on his Single Standard mine. We are very glad to see Mr. Kirkpatrick return to camp, for he is not the sort of man to do things by halves. He came prepared to stay all summer.

Meachem's mill is now running on ore from the Star King mine.

Some of the miners are going in to the coast for the summer, but the principal mines will continue through the summer this year the same as they do in winter.

Isaac B. Reed is drifting south on the Sweden No. 2, and is taking out some very rich ore.

DALE MINER.

MASSACHUSETTS.

(From Our Special Correspondent.)

BOSTON, MASS., June 5, 1899.

EDITOR JOURNAL:—The past week witnessed a severe drive against copper stocks in which the so called Standard Oil holdings were the severest sufferers.

Ever since the Amalgamated Company's stock was floated, the public has been watching the curb quotations, and when it was discovered on Thursday of last week that the insiders were not supporting this stock at par, the public began to unload both Amalgamated and other copper stocks.

No one has yet been able to advance a legitimate reason for this temporary scare, as the statistical position of the metal is fully as strong as it has been at any time during the past nine months. With stocks like Amalgamated selling at 85; Arcadian at 41; Parrot at 46; Boston and Montana at 285 and Butte and Boston at 65, it can readily be seen that a bargain counter was open for investors who had hitherto kept out of the market. These bargain hunters were very busy buying stocks Thursday and Friday, and the result has been a good recovery from the lowest prices, although the losses made have not been entirely regained.

Such fluctuations interest us here in Boston probably more than the people at the mines, especially as there seems to be no reason from the miners' standpoint why stock values should depreciate at this time. To the investors such raids in the stock market have little interest, while to the speculators it oftentimes means losses extending from hundreds into hundreds of thousands of dollars.

The great copper industry, however, moves on without interruption, and from the standpoint of a student of the statistical position of the copper business, we can see no reason for changing our opinion that investments in legitimate copper mining enterprises are among the most attractive to be found in the United States.

In my next letter I shall hope to present to the readers of this JOURNAL a description of a new process for treating ore which bids fair to be of great interest to the mining fraternity. The invention is that of Professor Anton Graf, and the demonstrations already made have been sufficient to interest capital on an ample scale. The character of the men behind the enterprise is of the highest, and

we can say that of the many devices constantly being brought forward for treating ore this is the best of which we have heard, and it is entirely devoid of deception or fraud. With so many fake mining schemes—gold from sea water chimera, and liquid vacuum enterprises staring one in the face in the advertising columns of the daily papers, it is a pleasure to be able to write up something in the mining line which is so meritorious as this invention of Professor Graf's, and which can be described without any ulterior motives being imputed to the writer, as ample capital has already been subscribed.

ROBERT S. BICKFORD,
Stock Broker, 60 State street.

UTAH.

(From Our Special Correspondent.)

SALT LAKE CITY, June 3, 1899.

EDITOR JOURNAL:—The mining stock market this week showed no real improvement over the week previous. The market was sluggish and prices much lower. It would seem that the bottom had been reached on a great number of stocks, and the buyers' end bring splendid returns.

Ajax was lower.

Bullion Beck was in fair demand—quotations were somewhat lower.

Centennial-Eureka was quiet.

Chloride Point weakened and sold lower.

Daly-West was stronger. The shipment of ore has commenced.

Dalton & Lark's prospecting is being pushed.

Dalton was unchanged.

Dexter was lower on very limited offerings.

Daisy did some business on slightly lower prices. It is expected that the Superintendent will recommend that the mill capacity be increased.

Eagle and Blue Bell, on report of improvement in ore showing, was much higher.

Four Aces was unchanged.

Geyser-Marion was much lower, selling as low as 60 cents.

Grand Central was in demand around \$8.

Joe Bowers fell off a few points.

Joe Bowers Extension was about the same as last week.

LaReine, it is reported, will begin ore shipments in the very near future.

Lower Mammoth continued to fall, selling as low as 50 cents.

Little Pittsburg was a few points higher.

Mammoth was on the mend, closing above the \$2 mark.

Mercur was steady—stock was fairly active.

Northern Light was lower.

Petro is coming to the market with ore shipments soon.

Omaha was unchanged.

Ontario was quiet.

Richmond-Anacoda stockholders have failed to agree on consolidation proposition.

Sunshine is reported as looking very fine.

Swansea was lower—the regular dividend will be paid on the 10th.

South Swansea was off a few points.

Sacramento paid its regular dividend on the 1st.

Star Consolidated sold lower during the week, but recovered partly at the close.

Sunbeam was stationary.

Valeo was in fair demand.

Utah is sending to market a nice grade of ore from the recent strike.

Very respectfully, P. J. CONWAY.

Miscellaneous Mining News.

ALASKA.

W. J. Nolan of Philadelphia, Peter Kelly of San Francisco and P. J. Hannon of Minneapolis are the owners of a "lay" near Dawson, on No. 32, above Discovery, the Sulphur Creek claim belonging to Alexander McDonald. February 20, after having sunk three holes to bedrock and drifting twelve feet in each, they were discouraged and out of grub, and decided to abandon their lay. As one of their number mixed the last flour in the cabin for the final baking of bread, another went to the face of the last drift to pick out a pan of dirt for a test. It was brought into the cabin and washed out. There was joy in camp that night, for the pan netted \$12.

Next day work was resumed and has continued ever since with increasing richness in prospect. This is but one of the many similar instances of what persistence will do on claims abandoned as valueless on Sulphur Creek. Many claims abandoned by laymen have shown up rich in subsequent development. The generally accepted theory here is that where a pay streak is not found in the creek beds, it may be found in the hillside and bench claims.

ARIZONA.

Max Cohn, a well-known prospector writes from Arizona to his partner, Manny Lowenstein that he has found a promising vein of gold ore at the west end of the Eagle Tail range, five miles northeast of Montezuma Head, and about ten miles from the Gila, in Maricopa county. The vein is in granite, with porphyritic footwall. The rich ore is on the footwall, and is composed of oxidized iron, copper carbonate and copper glance, quite distinct from the rest of the ledge, which is white quartz. The pay streak is six inches wide. Samples of the ore show free gold and assay \$1500. The extent of the vein has not been determined as very little work has been done on the claim.

William Grigg has opened up a good vein of gold bearing quartz in the Lost Basin country, Ariz. The ore is worked in an arrastra. A recent clean-up netted a good sized bar of bullion.

The cyanide plant at the El Dorado canyon, Ariz., is proving one of the greatest successes of the age. The values are saved up to 98 per cent, the highest ever reported with this process. The loss of cyanide is only one-half pound to the ton, representing a loss of sixteen cents. Thirty-eight tons of ore are worked daily, and the average value per ton is about \$30. When all the refuse ore and tailings, are worked up an immense plant will be put in and water pumped up to the mine.—*Mohave County Miner*.

Ehrenberg, on the Arizona side of the Colorado river, about 60 miles on an air line from Yuma, is looking up brightly. Rich dry placers have been discovered, and a large, energetic camp has been established. Over \$2,000,000 was taken from the placers of this section some 25 or 30 years ago, and as much more will be taken out in the near future.

CALIFORNIA.

AMADOR COUNTY.

The new shaft at the Tellurium property near Pine Grove is now down forty feet in ledge matter. The quartz taken out is being

hauled to the Reward mill, together with that which lies on the dump of the old shaft, and there milled. Grading is progressing on the old shaft for the erection of a hoist.

The lessees of the Red Hill mine at Jackson, who have been doing a good deal of dead work and at the same time operating the mill, made a \$700 clean-up during the past week.

The Kennedy-Argonaut CaseAppealed.

The big Amador mining suit between the Kennedy and Argonaut mining companies of Amador county, and which was decided by Judge Nicol of this county in favor of the latter, has been carried up on appeal to the Supreme Court by the Kennedy people.

CALAVERAS COUNTY.

John E. Burton and Hugh J. McSorley are sinking a hole to prospect for gravel on the John Cavanero ranch, Camanche mine. The hole was drilled by machinery, and is about eight inches in diameter and 160 feet deep, 20 feet of which is in gravel that prospects well. They have recently bought some property from the McLaughlin estate, on which to continue mining operations.

INYO COUNTY.

Ballarat Items.

The P. D. Q. Cyanide Co. have finished the tailings at the Montgomery's mill in Pleasant Canyon, from which they succeeded in extracting about \$8 a ton. This lot of tailings is the product of the World Beater and other mines of the Montgomery Bros., situated near the head of Pleasant Canyon, and near the Harrison & Godsmark mine.

The Cyanide Co. will begin on the tailings at Anthony's mill with a 10-ton equipment, and will send a like plant to the Reward mill to handle the tailings there. They have also ordered a small plant in sections to be packed into Beveridge district.

Grading has been finished and full preparations made for moving the Bryan mill formerly at the mouth of Pleasant Canyon up to the World Beater mine; when this is done another bullion producer will be added to the county.

Charles Anthony has fifty tons of ore at the mill ready for crushing.

Weaver and Porter Bros. are running their mill at Ballarat on custom ore.

Last week at Stone Corral one man pounded out \$80 and another \$130 in a common hand mortar in a few hours.—*Inyo Register*.

RIVERSIDE COUNTY.

Eagle Mountain District.

In the case of King vs. Adams over the possession of the Korn Springs property, including the springs for water; the Korn Springs mine and Bryan mine was decided May 13th by Judge Noyes in favor of the defendants Adams.

The two-stamp mill owned by Adams and Pickering is running day and night on ore from the Korn Springs mine and some custom work. A bar of gold bullion was recently brought to Los Angeles from the Korn Springs mine.

The Iron Chief mine has cut a new ledge. There are six carloads of ore on the dump that will average about \$100 to the ton. Indications of rich copper-bearing gold ore are

prominent, in fact, the copper ore is being shipped to the smelters, two teams being steadily employed hauling it from the mine to Walters station on the Southern Pacific. The 60-ton cyanide plant is working about 30 tons of ore per day. The owners are employing about 15 or 20 men.

The Gold Canon Mining Co., whose property is six miles north from Salton, have five stamps of their 10 stamp mill in operation on some fine ore from a mine formerly owned by Fish & Sons.

The Blackbird group of claims, owned by Messrs. McGrath, Tallent and Wittpenn, is showing up in good shape. Development will soon be vigorously prosecuted.

The Happy Jack mine, owned by Mike Conway, is one of the fine properties of this section. He is extracting the ore from it and milling the same at Adams & Pickering's mill.

A great many claims in this section which have been neglected in the past year have recently been relocated. Some 32 of the most promising properties have been secured by an English company, who propose developing the best of them.

The ore being produced by the Gavilan Gold Company's property near Perris is phenomenally rich. The shaft is down about 250 feet, and work is still progressing with a good body of rich ore in sight. The company's 10-stamp mill is running night and day. H. B. Varcoe is the manager of this property.

SAN BERNARDINO COUNTY.

Gold Mountain Sale.

At a point about forty miles east of Victor and five miles northeast of Bear Valley Lake at 7800 elevation, are located the Gold Mountain mines, owned by E. J. Baldwin; Sam Baird's property and what is known as the Walbreck claims, all of which have lately been examined and purchased by a syndicate of which J. R. DeLamar is at the head. The consideration is not known, but is reported at \$80,000. It is positively known that Sam Baird received \$28,000 in cash for his property. The Gold Mountain mines have a large amount of superficial development in the form of open cuts. The gold occurs in quartzite which lies like a cap on the summit of the hill. The quartzite is greatly shattered and in some places crushed and pulverized. In those portions which have sustained the greatest amount of crushing, bodies of massive quartz of irregular shape and size have formed, and it is in these portions that are contained the greatest amount of gold. The 40-stamp mill was burned years ago, since which time nothing was done until 1893, when an experimental mill was built. This was abandoned after a short trial. It was reported in May, 1896, that E. J. Baldwin would again begin operations at the Gold Mountain property, but nothing was done at that time. Later, in December, 1896, John A. Church and Thomas Worden secured a bond on the property for Eastern people and began development work on the mines. A 5-stamp mill was erected, together with boarding and bunk houses, and other buildings. Sixteen miners and numerous other men were employed at the time. After a time work was discontinued, however, and nothing has been done with this property since. The present company will erect a 200-ton cyanide plant, and with the improved methods now in existence, will quarry the ore, transport it to the plant, and treat the whole

mass at a cost of less than 75 cents per ton. The proposition as it is at present, is not a profitably free-milling one, but will average about \$6 to the ton. The ore will run from \$1 to \$20 per ton, while the quantity is practically inexhaustible.

TULARE COUNTY.

The third payment on the Minnie-Ellen mine at Deer Creek, Tulare county, Cal., was made a few days ago, which proves the mine is fulfilling the expectations of the bonder.

It is reported that the prospects are excellent. There is a 51-foot shaft with drifts about 27 feet west, and also others about 20 feet north and south from the same shaft.

The rock from the ledge exposed in each of these drifts will average \$15 to the ton. The ledge in the north drift from the west drift is seven feet wide. It is expected that the shaft will be sunk fifty feet deeper, and drifts made the same as those being operated at present.

If the new developments prove as good as it is expected water will be piped from Deer Creek and a mill erected. There are about 250 tons of pay ore on the dump at present.

TUOLUMNE COUNTY.

At the Temescal mine the work of placing in the concentrators was completed last week, and the mill will start up shortly. In the mine some very rich rock has been encountered in the new tunnel about 200 feet below the old. After driving the crosscut 70 feet the vein was tapped and though only 8 inches wide, it is fairly lousy with gold. It has been drilled on 20 feet to date, and in the face is very rich. This strike promises to be quite valuable. Work in the long tunnel, known as No. 1, has been discontinued for the present, but it is expected to soon resume drifting on the vein, which in that working is three feet wide.

In the Dreisam, an upraise is being driven from the 230 foot level, sinking from above being carried on simultaneously, and when the connection was made between the two workings it will change the shaft to one of sufficient size for two compartments. The crosscut tunnel is in 415 feet, and 35 feet more of driving will effect a contact with the east vein. The mine in general is said to be looking better than ever before, with plenty of good ore in sight.

At the Buchanan everything is reported as being in excellent shape, with a big showing in sight for the future. The main shaft is now down 600 feet, with sinking going steadily ahead. Since Mr. Moorehead has assumed the superintendency this shaft has been driven over 260 feet.—*Sonora Union-Democrat.*

COLORADO.

The strike in the Baltimore lease of the Vindicator, made a few days ago, is holding exceedingly well, and in fact is becoming greater with development. At this time about two feet of \$125 ore is being mined in the shaft. Sinking will be continued until sufficient depth is obtained to start stoping.

The shipments from the Fanny Rawlings during the past seven months, ending May 1, 1899, amounted to a total of 5,537 tons of ore. The gross returns from this ore amounted to

\$109,100. About \$50,000 of this amount was paid for smelting charges. The Fanny Rawlings Company received \$40,000 in royalties, and the sum of about \$120,000 went to the lessees for mining expenses and profits.

The gross value of the sulphide ore now being shipped from the mine is about \$50 per ton. At the present time something like 20 tons are being hoisted every day, and it is expected that the daily output will be increased within a short time.

Jack Pot at Cripple Creek has again encountered fine ore, having come into a four-foot body of sylvanite good for five ounces to the ton. The Isabella Company made a good stroke and added to its already extensive territory by purchasing the Comet claim for \$10,000, thus obviating the possibility of future litigation with the former owners of the Comet.

IDAHO.

In the case of the Basic Company vs. Theo. F. Van Wagenen et al., of Boise, Idaho, the Federal Court found for the defendant. The evidence the defendant brought out was to the effect that after his resignation as superintendent of the Basic Company's property, he entered into a certain option with A. Cunningham and S. K. Goldtrap, whereby he was to prospect the Goldtrap property, and if this demonstrated the property valuable, he was to have a dredge placed upon it, and that upon the happening of certain other contingencies two-thirds of the property was to be conveyed to Theo. F. Van Wagenen.

This all occurred long after he severed his connection with the Basic Company. The defendant denied that he at any time contracted with reference to the Grubstake claim. He also denied that at any time during his employment with the company that he was instructed to purchase for the company the property specified in the complaint, or any part of it. The court held that there was no cause for action and dissolved the injunction restraining Mr. Van Wagenen from working the property. Eastern capital is interested in this proposition, and since the title is cleared work will be prosecuted with vigor under the able management of Mr. Van Wagenen.

MICHIGAN.

Mass Consolidated Mine.

The greatest activity is being displayed at this property, since the pumping out of No. 3 Ridge shaft. Seven power drills are now at work, and Captain Trezona says: "Everything is going nicely here. The fifth, sixth and seventh levels east of No. 3 shaft look very promising; a nice amygdoloid vein with a little copper. The seventh level west looks as though it was a bonanza. Unless I am greatly mistaken, we have reached a good deposit of copper in this drift."

Agent Matthews has already begun inquiries for rates on mass and barrel copper by boat from Ontonagon to smelting works at Hancock. The only thing that is retarding development work at this property now is the horrible condition of the road to the station over which it is impossible to haul the large amount of machinery and lumber needed and which is at present on the siding at the station.

MINNESOTA.

In view of the late opening of the navigation and the labor troubles that have interfered more or less with the movement of iron ore from the head of the lakes, it seems somewhat surprising that the iron ore shipments to June from the head of the lakes, Duluth, Superior and Two Harbors, should show a substantial increase over the shipments to the same date last year. But the records show that such is the case, and the increase is shared by all of the ore docks at the head of the lakes.

The total shipments of ore from the three points mentioned, to June 1, was 925,782 tons, and the shipments for last year, on the same date, were 805,897 tons, showing an increase of 119,897 tons. The first cargo of ore that was shipped this season from Duluth was on May 4, as compared with April 21 as the date of the first cargo to go forward last year. The first cargo to go forward from the Iron Range docks at Two Harbors this year was on May 3, while shipping from there last year also began in April. The Duluth, Missabe & Northern docks this season, to June 1, have 344,482 tons as compared with 249,140 tons on the same date last year. The Duluth & Iron range has shipped 495,300 tons, as compared with 376,745 tons for the same period last year. The Eastern dock on Allouez bay has shipped 86,000 tons this year, as against 80,000 tons at this time a year ago. *Duluth News Tribune.*

MISSOURI.

Bartlett, Campbell & Baker made a good strike of ore on the Bingo, and in consequence several lots have been let out to sub-leasers. They are sinking with a steam hoister. Joe Meyers is part owner of the tract and is superintendent.

The Quality Ridge, on the American Lead & Zinc Company's lease at Central City have 25 tons of jack in their bin, and fully 50 tons on the dump that has not been milled. Last week they struck a good run of lead in the head of the drift 60 feet from the shaft.

The new mill at the B. & C. mine between the Empire mine and the Joplin Prospecting Company's tracts, west of town, is now completed and in running order. The mill was built by the Webb City Iron Works and is fitted up with the very latest improved machinery. It is equipped with a Leyner air compressor and air drills from the works of the Edward P. Allts Co., of Milwaukee, Wisconsin. The B. & C. mine has a good face of ore developed and its proximity to other developed properties gives assurance that it will be a big producer.

The new 100-ton mill of the Glendale Mining Company on the Kohinoor will be started up shortly. This plant is thoroughly equipped. It is provided with a 100-horse power boiler, 55-horse power engine, 16 inch crusher, 3 sets of rolls and Cooley jigs. The ground has been put in good shape during the past month for handling a large quantity of dirt, and everything seems to promise that the Glendale will show up some fine turnings. The principal owners of the Glendale are T. D. Dale, Marietta, Ohio, and Chase Andrews, of Janesville, Ohio.—*Joplin Herald.*

MONTANA.

The mines at Trail Creek closed down June 3d for an indefinite period. The men were paid off and only the work of pumping will be done. This news will be read with regret by many people in Park county who have looked to the opening of the splendid coal mines at Trail Creek as the harbinger of an era of prosperity for labor and trade in this country. The mines were closed pending the settlement of the question of building a railroad to the mines, and as the men who own the property, Cook & Bell, of Helena, and the manager, George White, are energetic and progressive, it is likely they will bring about a more favorable condition of things before many weeks and arrange matters so that the mines will be running again.

The Ira Myers Prospecting and Development Company of Great Falls is sending a large amount of mining machinery into the Sweet Grass district and expect to do a large amount of work there this summer.

The Hope mine is closed down for awhile on account of inability to handle the large amount of water. New pumps have been ordered and the work will be continued soon.—*Helena Independent.*

NEVADA.

S. A. Knapp came down to Hawthorne from Belleville a few days ago. He reports that Ganong and Daucher have cut the ledge and they have 14 inches of \$40 gold ore.

It is reported in Aurora, Nev., that Messrs. Parr & Tyack, of Bodie, have purchased the Blasdell mining property of this place. If such is the case, it is a good omen for Aurora, as both men are experienced miners and have the necessary means to prosecute the work.

Recently the Silver Peak mines, near Silver Peak, Nev., passed into the hands of John I. Blair, who has closed the mortgage on the property through the United States Circuit Court, for \$655,000, which sum just covers the amount of the mortgage and the costs. The effect of this sale will be to take the title to these great mines from the Silver Peak Mines Co. and transfer it to John I. Blair individually. The ownership of the mines is practically unchanged, as Mr. Blair was the principal stockholder in the old company.

NEW MEXICO.

Gold Excitement at Portales.

The reported finding of several pounds weight of flake gold in a watering trough about six miles southeast of Portales, N. M., has caused the town to take a boom, and in the course of seven days 186 mineral claims were staked out in the arroyo where the gold was reported to have been found.

It is said that six weeks ago a well was dug in Portales draw and the windmill pumped the water into a trough. About two weeks ago it was found that the bottom of the trough was covered with a mineral substance which was declared to be gold, and the rush to stake claims commenced.

Claims for ten miles up and down the draw are now taken up and staked.

The topography of the country is against the finding of gold in paying quantities. The Portales draw is about four miles wide.

OREGON.

Union County Mines.

The lessees of the Talmadge property, the canal and placer mines, are running a force of twelve men day and night.

William Crouter, one of the lessees, sent in a very satisfactory cleanup.

Merritt & Co., on Eagle Creek, are working their placers with a large force of men.

Bement & Co., owning the East Eagle mines, have just sent in a force of men and supplies for a resumption of operations.

C. D. Reid, of Polo, Ill., who is interested in the Union mine at Sparta with E. E. Clough and J. A. Wright, have struck some phenomenally rich ore that bristles with gold. A shipment of this ore will be made to the Baker City Sampling Works in the near future. The good prices received from the sampling works have stimulated ore shipments, and a number of properties unable to reduce their ore with stamp mills intend to pursue active operations this year with a view of shipping to the sampling works.

The Basin mines, near Sanger, are the scene of great activity. Some wonderfully rich ore is on the dump the result of the past winter's work. Report has it that some good strikes have been made in the vicinity of these mines.

A New York syndicate has representatives in the Eagle Creek section exploring for copper properties.

SOUTH DAKOTA.

New Mining Law.

South Dakota's new mining law, which will become operative July 1, provides among other things that any mine employing men upon the property must first post upon the mine a notice of any mortgage or other existing incumbrance.

The Colorado Company, which has bonded the large tract of mining ground on the Homestake trend of ore between Lead and Kirk, will take up the bond and make final purchase of the ground. The deal has been pending for some time and active work on a shaft has at last commenced.

The Holy Terror Consolidated Mining Company is putting in a cyanide plant at the mills in Keystone. The concentrates from the ore have heretofore been sent to the smelter. A Colorado cyanide expert is making tests at the old cyanide mill at the Holy Terror mine, in an attempt to adapt the cyanide process to concentrates from the mine.

The company has commenced paying dividends again. The capital stock has been increased to 500,000 shares. The main shaft in the Holy Terror mine is being sunk 200 feet deeper.

UTAH.

Utah Producers.

There is some talk of the resumption of operations at the Buckeye, near Tintic.

The mill at Chloride Point, Mercur, is at work, and some very nice ore developments are reported in the properties.

It is reported that there is a widening out of the high grade ore in the Eagle and Blue Bell—Eureka, but no definite information in regard to the reported strike can be secured.

The last of the Geyser-Marion's debts, Mercur have been paid, and it is expected that this mine will pay dividends in a short while.

The long delayed shipment of the Daly-West Company's ore has commenced, and some heavy shipments may be expected.

The La Reine Co., of Eureka, is soon to commence the shipment of ore in the near future.

Dividends will be resumed next month by the Mammoth Company, of Mammoth.

The Petro, at Bingham, is expected to pay 2½ cents per share, after July. Heavy ore shipments have just commenced. It is a silver, copper, lead and gold property.

Utah, Fish Springs, is sending some high grade ore from the recent strike, and dividend is expected to be paid in the near future.

WASHINGTON.

The owners of the Lucille, near Northport, Stevens county, have begun the active development of that property with four men. They are getting a free milling ore in character.

The face of the tunnel in the Red Lion, near Rock Cut, Stevens county, on the Reservation, is reported in four feet of solid ore, high grade copper. Development work has been in progress all winter on this property.

A company has been formed with \$100,000 capital to develop the recent coal find at Budoda, Thurston county. The assays of samples sent to San Francisco gave results better than the average, and the quantity of the coal is said to be practically inexhaustible.

Dayton people are said to have made a discovery at Tuskanon which assays \$15 in gold, and according to a Portland assayer contains vanadium, a rare and costly mineral. The owners have incorporated under the name of the Big Four company.

E. C. Haber, representing a German syndicate, has made the final payment on a group of five claims in Troublesome basin, 13 miles from Index, Snohomish county, upon which he had taken a bond a year ago. Mr. Haber has been doing extensive development work on the property having expended probably \$60,000 in the work and now has a large number of men engaged.—*Miner and Electrician.*

FOREIGN MINING NEWS

BRITISH COLUMBIA.

A deal has been consummated by which the Madison group of three claims, the property of J. C. Eaton, was sold to McCuaig, Rykert & Co., of Montreal.

It was a cash transaction, of which the price is said to be \$20,000.

The Madison is considered one of the best prospects in the Sandon district, and recent development has shown up some extensive bodies of high grade ore. W. W. Warner, who has been working the property under a lease, struck an ore chute in the No. 3 tunnel on the Argenta claim which showed to inches of grey copper, giving an aggregate assay value of \$300 to the ton.

A contract was let to Mr. Warner to run 100 feet on No. 4, which is now in 25 feet,

and for 400 feet on No. 5, which will be started at once. All these tunnels are being driven on the ledge. Sixteen men will go to work immediately working three shifts.

LOWER CALIFORNIA.

Lower California Mines.

The recent reports of gold placer discoveries inland from San Roque Bay in Lower California have attracted much attention, there having gone to the section from 600 to 1,000 men—some miners and many tender-feet.

The placers will not prove the bonanza that was expected. It may be possible for a man to make wages, and he may make more. The best ground discovered is nearly worked out, and unless something new is discovered the camp, as to placers, will not be permanent. As the country covers a wide area a great strike may be made. There is gold everywhere, but in no great quantity, except in a few places, and these spots as far as discovered are worked out. Provisions are high and water scarce. The burro men charge \$2.50 per 20 gallons delivered at the camp. So that the cost of living is great.

A man might strike it rich, or he might take advantage of some one else's strike, but as it is at present all is uncertainty.

The latest reports from the placers are conflicting, but it is conceded that with the necessary tools for working dry placers, it is possible to make good wages with the chance of making a big strike. The amount taken out runs from \$3 to \$30 a day gold. A pack train runs from the landing to the mines that are about 24 miles inland. The charges for packing range from 3 to 5 cents, Mexican money, per kilo, or from one-half to 1 cent per pound, gold.

However, if one does not consider the placers at all, the chances for mineral-bearing ledges being discovered are almost certain.

It will be remembered that in 1893, when the rush was made to Alamo, about 70 miles southeast of Ensenada, on account of the placer discoveries, there were no great mines in operation in the section; but after the excitement had subsided, prospecting for the ledges from whence the placer gold came, brought to light some of the greatest mines Lower California has today, among them being the Viznaga, Aurora, Piedad and others.

The same process of discovery and development took place at Calamalli at a later date. This place is located about 80 miles north of the present strike. Since that time numerous quartz mines have been discovered and worked, notably among them the Ybarra Mining and Milling Co.'s property.

Santa Rosalia, the great copper camp of Lower California is located due east of San Roque on the Gulf of California, where the Compagnie du Boleo, a French corporation, is operating under the able management of Chas. Laforgue. This company is capitalized at \$2,400,000, and owns the Boleo, Providencia and other excellent properties. Shafts have been sunk and tunnels have been run, and from 250,000 to 300,000 tons of ore have been extracted. The power used to run the smelter and other machinery is steam and electricity.

In fact, a trip around the peninsula will show numerous valuable mineral-bearing sections. At Jacalitos in the northern part of the state, on the Pacific side, are the Cristo Mining Company's property, also the mines of the Trinidad Mining and Milling Co. The Alamo properties have been mentioned in the fore part of this article.

Near San Isidro are located the great iron

deposits of the Tepastete Iron Co., which is capitalized at \$100,000 and is being operated under the management of J. Frank Watson. Triunfo in the southern part of the peninsula, has some fine gold properties, notably among them the Cia Progreso with its 60-stamp mill. On Carmen Island, located about one-third the way up the Gulf coast, is situated the Carmen Island Salt Company's property, owned by Chicago people. This property has produced some 75,000 tons of table and rock salt. Farther up the coast is located Santa Rosalia, and still farther up we find Baja Angeles, where the San Juan mines are located. This company has two mills, which are connected with the mines by a wire-rope tramway, 12,365 feet in length, which was described in our issue of June 15th, 1898. At the head of the Gulf are located the great sulphur mines of the Mexican Sulphur Co.

MEXICO.

Barranca del Cobre.

Barranca del Cobre, the copper property is 150 miles southwest of Chihuahua and about 100 miles north of Batopilas. The ore is copper glance, containing gold and silver. It is reported to run 12 per cent copper, with enough free gold to pay the milling costs. The mill plant comprises a 12-stamp mill, a Huntington mill and Frue vanners. The vein, which is from 2 to 18 feet wide, has a dip of about 60 and outcrops on both sides of a great chasm, 3,000 feet deep. It is worked entirely by drifts, the lowest opening being just above the stream in the bottom of the chasm. Mexican owners worked it for gold, and later an English company spent a large amount of money in improvement, but the distance from a railroad and the cost of getting in supplies by mule train has kept down development. The completion of the Chihuahua & Pacific Railroad will, however, improve transportation facilities. The property is now owned by the Lewis Company of Mexico City and New York, that proposes to develop it on a large scale, increasing the output to 100 tons of ore daily. The ore now going to the mill is taken wholly from development work.

GENERAL NEWS.

THE MINERAL AND OTHER RESOURCES OF VENEZUELA.*

BY SEÑOR FRANCISCO J. YAMES.

Venezuela is one of the richest countries of South America. Her resources are almost unbounded, and her geographical position is such as to adapt her most peculiarly to establish closer trade relations with the United States. Lying in the northern central part of South America, her coast where all her ports are situated, is washed by the Caribbean Sea. The distance from Venezuela to New York is about 2500 miles, and there are several lines of steamers connecting her with the countries of both the New and the Old World. I must state here that the only American line of steamers carrying passengers or freight to any South American port is the line that connects directly New York with our main ports.

Within its boundaries the territory of Venezuela covers an area of 597,960 square miles,

* Paper read before International Mining Congress, held in Salt Lake City, Utah, July 7, 8 and 9, 1898.

which surpasses in extent that of France, Germany and the Netherlands, or the combined States of Texas, Colorado, Idaho and California. The population of this vast territory is not, however, in proportion to the extent of the land as it only amounts to about 2,500,000 souls.

The topographical conditions of Venezuela have been a drawback to the more rapid progress in the development of her means of internal communication, because, like all countries which are crossed by the mighty Andes, the difficulties in the way of the interior trade are measured by the obstacles to be overcome. Lack of labor and capital on the one hand, and on the other the natural wealth of the country covered with an exuberant vegetation will be the principal causes of the slow development until population increases bringing with it necessities almost unknown in Venezuela.

Notwithstanding this condition, we have several railroads in successful operation and many highways and roads in excellent condition as well as mule paths. The principal wealth of the republic is agriculture and cattle-raising. Mining is as yet an incipient industry, although, according to the latest statistical data, we have 226 known mines in the country, furnishing forty-two different kinds of minerals.

There is, perhaps no country richer in minerals than Venezuela, nor one that has made less effort to develop this wealth. Aside from the old copper mines of Aroa, whose products go almost exclusively to Great Britain, and the well known gold mines of Guiana, particularly that one called "El Callao" which astonished the world with its marvelous yield for several years, the other works of the mining industry are as yet in their infancy.

The richest gold-bearing region of Venezuela is the region of Guiana. It was here, we may say, that the fabulous land of "El Dorado" was located which attracted so many adventurers to the coast of Guiana since its discovery in the fifteenth century.

According to the old Spanish records, dating as far back as 1735-1740 gold and silver had been found in the then province of Guiana, samples of which were ordered to be assayed by the king. The report of the assayer submitted to his majesty showed that the samples sent were simply outcroppings and that they contained gold, silver and iron, the report stating that were the diggings deeper the mineral would be richer. These silver and iron mines have been lost, and out of the several gold mines existing there at that time and mentioned in the same documents, only two or three are known today.

This section of the country, as I before remarked, is the richest in gold mines, the exports of this product amounting in four years (from 1886 to 1890, according to statistical data) to a little over nine tons of gold. In connection with this an English authority, which surely cannot be accused of being partial, states the following: "It is well known that Venezuela possesses some of the richest gold fields in the world, and it is probable that much of its auriferous wealth is, as yet, undiscovered. We do not allude to fields which have recently been explored in that 'No Man's Land' on the borders of the Republic, and the colony of British Guiana, the value of which was one of the principal causes of bringing the boundary question to an acute stage last year, but to those of the Yururi, south of the Orinoco, upon undisputed Venezuelan territory on which vast amounts

have already been spent in developments. In this district is situated the famous mine of 'El Callao,' the shareholders of which were only a few years ago regarded as the luckiest of speculators. As it has been proved that gold exists abundantly in this district, and under conditions which would render its extraction remunerative in almost any other country in the world, its failure must be attributed to some other causes than the risks and difficulties ordinarily attending this class of enterprises.

"From statistics published in the Venezuelan papers we observe that the average yield of gold per ton of quartz crushed at 'El Callao' was never less than about two and one-half ounces. It is said that the lode has been lost or worked out, but it is difficult to believe that it would not be struck again if properly conducted explorations were made."

In addition to these gold mines there are others of the same metal which are also considered to be very rich in other parts of the country, such as the Bruta and Chacao mines in the State of Miranda, the Buria mine at Barquisimeto, which was also worked by the Spaniards in the Sixteenth century, and the mines of Temerala and Canabo in the state of Carabobo.

There are in all sixty-two gold mines known to exist in Venezuela, as follows: One in each of the following States, Los Andes, Bermudez, Falcon and Lara; two in Zamora, four in Carabobo, eight in Miranda and forty-four in Bolivar.

(To be Continued.)

THE REDUCTION OF ORES.

BY C. E. BOGARDUS, OF SEATTLE.

(Begun in our issue of May 1st.)

As the copper increases, we pass into copper smelting, which, though it in turn verges into lead smelting, the iron on the one side and the lead on the other, still has its own necessities and is distinct.

Copper smelting is used to treat all copper ores, and is simply one step in the process which is taken, step by step, until metallic copper is obtained.

Copper occurs, as native in a few places. This ore is treated quite simply, being crushed, concentrated, melted and cast into ingots. This copper ranks higher than that from other ores until electricity was introduced for refining.

Copper smelting, or matting as it is usually called, because the process in most cases is a matte, has within the last few years made a great advance, the Americans being far in the lead.

The sulphuret ore must be roasted, as the extra sulphur is not used as fuel, but a small amount is necessary to unite with the copper and iron to make the matte. Roasting is conducted in a variety of ways, from the cheap crude method of heap roast, known from antiquity, to the modern automatic reverberatory furnace.

The heap roast is made by properly piling the ore in heaps 24x46x6 upon a bed of fuel, with correctly arranged draft holes and chimneys. Only sufficient fuel is used to get it under way, when the burning sulphur keeps it going. From sixty to seventy-five days are needed to burn a heap of this size. The product is an oxide of iron, oxide of copper, some copper sulphate with a small amount of unroasted material. When cool enough to handle, the mixture goes direct to the furnace. In the reverberatory furnace of today, the ore is pulverized and fed at one end,

where a flame plays over it. The sulphur immediately begins to burn, and the material is now slowly moved along the furnace, getting hotter and hotter as it approaches the fire. Unless the melting is done in this furnace, it is withdrawn in the form of a powder, the sulphur all gone and the metals in the form of oxides. The most improved furnaces now have automatic stirrers and automatic dischargers.

In copper smelting it is not the object to get as high grade matte as possible, for two reasons—subsequent operations can be conducted better and the precious metal saved closer. About a 40 per cent matte is the first product. The fluxing is different from lead smelting in having a wider range as to slag, not being bound down to a fixed limit. The aim is to have a slag fluid enough for the matte to settle through and not too thin, or the matting will not be perfect.

The furnaces used are water jacket shells of copper, cast or wrought iron. Some brick ones are in use, but they are losing ground. The charge is fed continuously at the top, and like the lead smelter there is not a stop except for accidents. During fusion, the copper unites with the sulphur, making copper sulphide, the balance of the sulphur combines with iron and the two sulphides form the matte. The percentage of iron sulphide determines the grade of the matte and that is fixed by the amount of sulphur. When an excess of sulphur is allowed, it takes too much iron into the matte and robs the slag of necessary iron; if sulphur is deficient, the grade of the matte is too high and the slag gets the iron, making it too thin.

In the old style furnace the matte was allowed to settle to the bottom and was drawn off at intervals, as was also the slag, the matte being then refined by roasting and remelting, slowly raising the grade by eliminating the sulphur and the iron until pig copper was obtained.

Today at the most advanced works the separating of the slag and matte is done in another furnace, a reverberatory hearth, where they are allowed to run in a molten state and kept so. The slag is tapped off and the matte maintained in a fluid state. As needed it is conveyed to the large Bessemer converters, where the purification into metallic copper is accomplished in one operation, by burning out the impurities, the iron being carried into the slag. The copper is cast into large plates ready for electrolytic treatment for separating the gold, silver and the small traces of other metals. These large plates are suspended in a sulphuric acid bath as an anode, and a thin sheet of pure copper is the cathode. As the current is turned on the impure anode dissolves and perfectly pure copper deposits at the cathode. The gold, silver and impurities drop to the bottom of the tank.

In treating oxide and carbonate ores, the product is black copper instead of matte. At times the raw sulphuret ores are smelted without roasting owing to certain conditions, but roasting is the rule. Nickel and cobalt, when in an ore, are saved in the copper matte.

Coming back to silver, there are two processes for treating exclusively silver ores which deserve mention. One, known as the Russell process, is used when the silver is as a chloride or bromide, soluble in a hypotetrosulphite of soda solution. The silver is precipitated as a sulphide, which is washed, dried, melted and run into bricks. Some of the ores, such as sulphides, etc., can be converted into a chloride by roasting with salt or salt and copper sulphate. Then there is

the old Mexican or Patio method of amalgamation, for the ores that are chlorides or can be converted into chlorides by roasting, as in the Russell process. The ground pulp in the form of a mud is placed in a Patio with mercury. In America a large amalgamating pan or barrel is used. The mixture is stirred and ground until the amalgamation is complete. The silver chloride is changed to metallic silver, which amalgamates. This silver amalgam is treated the same as gold amalgam. As worked in Mexico the process is crude, but it is used with great success there.

As to the new methods, it might be added, they are becoming as numerous as patent car couplers. Hundreds of mining and smelter men, electricians and inventors are working to solve the problem of a cheap means of extraction of the value from ores. Some are branching onto new lines, others trying to improve the old, bringing to their aid electricity, chlorine, bromine, cyanide and other chemical solvents, together with new ideas in furnaces and heat producers, combining different methods with various results. The goal is a means by which a small plant can be placed on the property, in the mountains, treat the ore there and treat it cheap. This would solve the problem for camps which today are at a standstill—ore, where lack of transportation facilities prohibits development; another having the railroad, but where the freight rate takes all the profit on the low grade ore. It would do away with trying to concentrate low grade material, where value is lost, and also treat ores of low value, but too high in sulphurets to be concentrated.

There are now in the west, to my knowledge, about a dozen of the revolutionizing processes, most of them claiming to extract the value for \$1.50 a ton at the mine. Many of the same pass into history each year. Some one will solve the problem, and for the man who does it there is an unlimited fortune awaiting him, locked up in a stronger vault than any bank. Who will find the magic key?

At this writing no one has proven that he has such a process. Before this is with the reader, some one may achieve this end. If so, it will be a boon to the man of small means. It means wonders for Washington.

The Gold Output.

Figures on the gold production, now coming to the Treasury Department, indicate that the world's production of the yellow metal for 1900 will equal \$400,000,000.

The official figures from various countries in 1898 are rapidly coming to hand, and indicate an increase in gold production alone of \$50,000,000 over the gold production of 1897, which was \$237,504,800. Returns for 1899 are already available to a sufficient extent to indicate an increase of more than \$50,000,000 over 1897, unless some unexpected catastrophe checks mining in South Africa or Australia, which will carry the production for the current year to about \$340,000,000. This rate of increase has now been running for several years, and it is believed at the Treasury that the year 1900 can hardly fail to show a gold production of \$400,000,000. About \$65,000,000 will be required for the arts, leaving \$335,000,000 available for use as money.

The gold production of 1896 was \$202,682,100, of which about \$138,000,000 was available for monetary uses, and the silver production was \$217,442,900 at the coining value, of which about \$175,000,000 was available for

monetary uses. The whole amount of both metals available at that time, therefore, if the mints of the world had generally been opened to free coinage of silver, was about \$113,000,000, which will be about \$22,000,000 less than the available supply of gold alone in the year of the next Presidential election.

The details which fill up this striking picture are drawn chiefly from the gold fields of South Africa, Australia, the Klondike and the United States.

The South African production is known and reported monthly by cable. The total for 1898 was about \$80,000,000, being an increase of about \$21,000,000 over the production of 1897. The four months of the present year have indicated an increase of 34 per cent over 1898, which would afford a total production for the year of over \$106,000,000.

The recorded production of Australia for 1898 is about \$68,000,000, an increase of \$12,000,000 over 1897. Every indication points to a similar increase for 1899, carrying the production for the current year to \$78,000,000.

The United States, which held first place in gold production in 1896 by a margin of \$8,000,000 over Australasia, and clung to second place by a neck in 1897, will drop below both the leading competitors for 1898. The official preliminary estimate, prepared by Director Roberts in January, put the production in 1898 at \$65,782,677. This will be slightly modified by the final revisions, but it is not likely to be reduced. The reports of the United States Mint at San Francisco indicate that \$16,520,553 in American gold was presented for treatment there, while the estimate of Director Roberts puts the California product at only \$14,883,721. The United States production of 1897 was \$57,363,000. The increase of \$8,000,000 for 1898 will be duplicated for the current year, and is likely to be increased next year. Colorado, California, South Dakota and Montana are making a tremendous fight to increase their product and the mines opened in Washington promise to be an important factor in the near future.

More Labor Trouble.

On the morning of June 13th the managers of the Omaha and Grant Smelters began blowing out the furnaces and in a few days more every plant belonging to the American Smelting & Refining Company, will be closed down, throwing several thousand of the employees of the company out of employment and incidentally a much larger number of miners, in coal as well as in metal mines, coke burners, teamsters and other workmen. Indeed, the effect of the shut-down upon Colorado can hardly be computed at this time. It is not known whether the smelters outside the company, including the extensive plants of M. Guggenheim & Sons, and the Boston & Colorado, will close or not. The former have offered their employees a somewhat higher scale than the trust, but not as high as the union demands.

The shut-down is the result of the new eight-hour law, which goes into effect June 15th. The smelter employees' union adopted a scale based on eight hours' work, which is practically the same as has heretofore been paid for ten hours. The American Smelting & Refining Company offered a raise of about 10 per cent, payment by the hour, and the men to work ten or twelve hours per day if they choose. This proposition by the union was formally rejected and the work of closing the smelters began at once.

The Anna May, located immediately south of the Elkton Consolidated properties at Cripple Creek, Colorado, and adjoining the Thompson mine, has been leased to Ezra Snyder and associates, who began work June 1 and will sink 300 feet as fast as it can be done, to catch the Thompson ore body, which is believed to run through Anna May ground.

If there is nothing in the formation to cut it off, it is believed the Anna May will have 500 feet of this vein, which is developed almost to the side lines of the Anna May.

Mr. Snyder is one of the best practical miners in the camp, and has interested with him some capitalists of Pueblo, and this property will be thoroughly developed as they have a two-years' lease.—*Colorado Springs Investor.*

Michigan Mine.

Development work on the Michigan mine, located near Ontanagon, Mich., is progressing rapidly.

"A" shaft has reached a depth of 250 feet, and the drift which was driven 20 feet eastward struck an old stope which communicates with old No. 3 shaft, which is 1,250 feet deep and filled with water to the fifth level. This stope contains tons of the rich stamp rock which has lain there for years, but will not be interfered with for the present. "B" shaft is 314 feet deep, and drifting east and west is still going on. The west drift is now in 135 feet and the east drift 150 feet. Some delay was occasioned in the west drift recently by a rich bunch of copper ground.

The Headlight Gold Mining company has been steadily at work since its organization and purchase of the Swede Boy mine, and reports are that it has reached a depth of 70 feet with a shaft 7 by 9 feet in size. This shaft was started on one vein, it was sunk vertically, and is now out of the vein in country rock that is affording excellent walls. It is to be continued to 100 feet and then drifts will be run into the vein on which it started and in the other direction to another that is six feet wide, tapping this at a depth of 165 feet from the surface. The two veins are about 75 feet apart, and an immense quantity of ore can be taken out at the first level, these mines are located in the Seine River district, Ontario, Canada.

They are sinking a very large shaft with a view to taking rock from three veins through it and it is working as rapidly as possibly day and night with one of the best steam hoists of any of the new companies of the district. Manager Rossman is on his way to the mine. He will have the buildings enlarged and increase the crews.

The Swede Boy is receiving more than ordinary attention from outside investors. The orders received by the company for treasury stock by every mail from the East is an evidence of the fact that the quality of ore now hoisted is worthy of the attention of the most cautious investor, which goes to prove that this valuable property in the near future will be sending out gold bricks equal undoubtedly to the Golden Star.

A shaft has been sunk 45 feet on the Golden Eagle, situated near the lake, and steam machinery will be installed soon. This mine, like the others of the region, is not dependent on one vein, for while it is sinking on a narrow quartz vein carrying gold to the value of from \$20 to \$22 all the way down, only a few feet away a vein 16 feet wide, runs from \$7 to \$9 and perhaps higher.

PERSONAL NEWS ITEMS

ALFRED J. SOLANO, C. E., will leave Los Angeles for Europe in the fore part of July on mining business. Mr. SOLANO is well known in Los Angeles and is connected with some of the best mines in Chloride, Mohave county, Arizona.

JOSE IVES LIMANTOUR, Minister of Finance, for Mexico, has recently left for Europe for the benefit of his health. He expects to take a course of treatments at Carlsbad, Germany.

DR. F. M. SIMONDS, of New York City, is in Central City, Idaho, examining a gold mine.

THE OREGON GYPSUM COMPANY have filed articles of incorporation in Portland, Oregon with a capital stock of \$350,000. The incorporators are S. P. RICHARDS, D. S. YORK and E. R. SMEED.

CHAS. MORSE, of Chicago, Ill., is in Spokane, Wash., having just finished inspecting some of the Coeur d'Alene properties in which he is interested.

PATRICK HOLLAND has resigned his position as foreman of the Empire Mine, near Grass Valley, Cal. and is now in San Francisco, Cal.

A. J. KING, formerly with the Jackson Drill and Manufacturing Company of Denver, has gone to Mexico by way of El Paso.

HENRY WICK, manager of the National Steel Co., of Chicago, is in Spokane, Wash., on a tour of inspection of the properties in which he is associated with FINCH & CAMPBELL and others.

H. PENGELLY, has been appointed superintendent of the W. V. O. D. Mine Grass Valley, Cal.

C. D. COLFAX, of the Calumet & Hecla Mines, is in Idaho examining some mining properties.

T. E. WOODMAN, of Chicago, recently arrived at Spokane, Wash. having examined his interests in the Coeur d'Alene properties.

JAMES LONG, JR. manager of the Breckenridge Mammoth Mines, Gold Mountain District, Utah, has recently returned to New York City.

LUTHER WAGONER, has gone to Mariposa County, Cal., to superintend the re-opening of the Francis mine near Mariposa.

ROBT. McCURDY, of Youngstown, Ohio, is in Spokane, Wash., on business connected with his interests in the Coeur d'Alene properties.

C. H. THOMPSON has resigned his position as chief engineer and chemist, for the New River Mineral Company to accept a similar one with the Empire Steel Co., at Goshen Bridge, Va.

J. H. McEWEN, of Youngstown, Ohio, recently arrived in Spokane, Wash. He is on a tour of inspection of the Coeur d'Alene properties in which he is interested.

VICTOR M. CLEMENT, M. E. recently manager of the DeLamar properties in Utah, sailed last week for London. He contemplates a trip through Transvaal before returning to this country.

M. A. GARLICK, of Youngstown, Ohio, arrived in Spokane, Wash., recently. He intends to make a tour of inspection of the Coeur d'Alene properties, in which he is interested, with FINCH & CAMPBELL and others.

JOHN LAWSON, manager of the Auburn Mine, on the Mesabi, belonging to the Minnesota Iron Co., has resigned and expects to come west soon.

JOHN E. ROTHWELL, of Denver, Colo., recently visited Cripple Creek, Colo.

OBITUARY.

WASHINGTON M. JACOBS of Tacoma died May 24, 1899, in Los Angeles, Cal. In 1874 he married Miss Rose MILLET, the daughter of a Chilean merchant. After a residence of ten years in Valparaiso he moved to Lima, where he was interested in the mines and published a semi-weekly paper, El Tumbos, and also Imprenta Americana. He was chief of the secret detective force of Lima and owned and operated a number of valuable copper mines. Mr. Jacobs also filled the office of paymaster on the railroads owned by the late HENRY MEIGS, and was one of that noted American's intimate friends.

At the breaking out of the war between Peru and Bolivia in 1880, Mr. Jacobs and family returned to San Francisco and shortly afterward removed to Tucson. He filled several offices in that city and owned much valuable mining property in the Territory.

The Mining And Metallurgical Journal

THE MARKETS.

All quotations, financial reports and other statistical material given under this head are New York Quotations, unless otherwise stated in each item. These figures are carefully revised each issue, and constitute a very accurate compilation of statistical matter.

NEW YORK, June 14th, 1899.
The following are the Silver, Copper and Lead quotations for the last two weeks:

	SILVER.	COPPER.	LEAD
June 1	61	18 75	4 25
2	61	18 50	4 25
3	60 1/2	18 50	4 25
5	60 1/2	18 50	4 25
6	60 1/2	18 50	4 25
7	60 1/2	18 50	4 25
8	61	18 50	4 25
9	61	18 50	4 25
10	61	18 50	4 25
12	60 1/2	18 50	4 25
13	60 1/2	18 50	4 25
14	60 1/2	18 50	4 25

SILVER.

Silver has not maintained the high level of April's closing figures. The excitement induced by speculation has died out. Prices have, however, held up over 28d., owing to limited offerings. The East has not been a buyer.

COPPER.

The market has been fairly firm, but very little business has been transacted. The only important change during the week has been a disposition to meet buyers of Lake at a somewhat lower price than that ruling during the preceding few weeks. We quote Lake 18@18 1/2c.; electrolytic, in cakes, bars or ingots, 17@17 1/2c.; electrolytic cathodes, 16 1/2@17c. and casting copper, 17c.

LEAD.

The improved condition continues to prevail, but prices have not advanced any further, the quotations being \$4.45.

Spanish lead has changed for the better, the price now being £14 5s. @ £14 6s. 3d., while for English it is \$14 7s. 6d. @ £14 10s.

SPELTER.

Spelter is unchanged at \$6.85@\$6.90 at New York, and \$6.60@\$6.65 at St. Louis.

Foreign quotations also remain unchanged at £28 10s. for ordinary kinds, and £28 15s. for specials.

ANTIMONY.

Antimony continues in good demand, with prices unchanged at 10 1/2c. for Cookson's; 10c. for Hallett's, "C" U. S. Star and Hungarian.

NICKEL.

Nickel continues unchanged and no alteration of prices can be reported. We quote for ton lots 33@36c per lb., and for smaller orders 35 1/2@38c. London prices are 14@16d. per lb., according to size of order.

TIN.

Tin has experienced a further decline from the highest prices recently reached, having receded to 25 1/2c. spot, with future entirely neglected. The happenings at this end have been merely a reflection of the events in the London market which is quoted in closing at £116 5s. per spot, £117 for three months.

PLATINUM.

The demand for Platinum is active and prices continue high. We quote for New York \$15.50 per ounce for large lots and \$16@17 for small orders; London is 62@54 can ounce.

TOTAL QUOTATIONS

TITANIUM CYANIDE.

Purified, 98@99 per cent., in cases of 120 lb. at 32c. per lb. in 5, 10, 25 and 50 lb tins at an advance.

QUICKSILVER.

The New York quotation remains \$4.2 per flask; the London price has again advanced to £8 2s. per flask, with the same figures quoted for second hands.

POWDER.

F. o. b., San Francisco: No. 1, 70 per cent. nitro-glycerine per lb. in carload lots, 15 1/2c; less than one ton, 17 1/2c. No. 1* 60 per cent., carload lots, 13 1/2c; less than one ton, 15 1/2c. No. 1** 50 percent, carload lots, 11 1/2c; less than one ton, 13 1/2c. No. 2, 40 per cent., carload lots, 10c; less than one ton, 12c. No. 2*, 35 per cent., carload lots, 9 1/2c; less than one ton, 11 1/2c. No. 2** 30 percent., carload lots, 9c; less than one ton, 11c. Black blasting powder in carload lots, minimum car, 728 kegs, \$1.50 per keg; less car lots, \$2 per keg.

COKE.

There has been a quiet trade in coke with a slight improvement reported.

IN CAR LOTS, ST. LOUIS.

Connellsburg fdy coke 72-hr. fry....\$4.70
New River....\$4.00 Pocahontas....3.90

Crushed.....4.70
Gas works coke, lump, per bushel....1.10

BORAX.

The San Francisco market in Borax is firm with a good demand.

The market is quoted as follows:

Refined, in carload lots, in barrels.....7 1/4
Refined, in carload lots in sacks.....7
Powdered, in car lots.....7 1/4
Concentrated, in car lots.....6 1/4

THE MINOR METALS.

Quotations are given below for New York delivery:

Aluminum:
No. 1, 99 per cent. ingots, per lb.....35@37c
No. 2, 99 " " ".....31@34c

Rolled sheets, per lb.....38c. up

Aluminum—Nickel, per lb.....	33@35c
Alum-bronze.....	26@23c
Bismuth, per lb.....	\$1.45@\$1.50
Phosphorus, per lb.....	4@5c
Magnesium.....	\$2.75@3.00
Tungsten, per lb.....	70c
Ferro-tungsten, 60 per cent.....	60c

Variations in price depend chiefly on the size of the order.

CHEMICALS.

A good and steady demand is reported and prices are firm.

CAUSTIC SODA.

Caustic soda, for next year's delivery, has been contracted for in a large way. We quote domestic high test at \$1.37 1/2@\$1.42 1/2 per 100 lbs. f. o. b. at works, \$1.45@\$1.55. Foreign caustic soda, highest test \$1.60@\$1.70, delivered according to test and quality.

ALKALI.

Caustic alkali for immediate delivery continues scarce. We quote for domestic, 65@70; foreign, 75@80c.

CARBONATED SODA ASH.

58 per cent., 90c and 95c. per 100 lbs. basis 48 per cent.

SAL-SODA ARD BI-CARBONATE OF SODA.

Sal soda and bi-carbonate soda are in good request. We quote for domestic, sal soda, 50c. per 100 lbs. f. o. b. at works, less usual discount. English, 60@62 1/2, and \$1.12 1/2@1.25 per 100 lbs. f. o. b. at works, for domestic ordinary, and \$2.12 1/2@\$2.25 per 100 lbs., for foreign bi-carbonate soda, according to brand and style of package.

CHLORATE OF POTASH.

Chlorate of potash is steady, and crystals have been quoted up to 10c. We quote crystals 9 1/4@9 3/4c., powdered 9 1/2@9 3/4c.

CHLORIDE OF LIME.

English prime brands \$1.60@\$1.70 American, \$1.70@\$1.80; Continental F. \$1.50@\$1.60 per 100 lbs.

BELTS WILL SLIP — BUT

CLING-SURFACE

WILL STOP IT PERMANENTLY.

CLING-SURFACE is to be applied to the inside of a belt.

It has been so universally satisfactory for the past three years that we can safely guarantee that its use will not only stop all slipping, but that the belts will become soft and pliable, yet firm; if of leather, they will become as soft as calf skin, and also absolutely water-proof; and furthermore we guarantee that the belts can be run slack, and that the power will be increased so much that in a fair-sized plant the cost of the sample can will be earned monthly.

This applies to all belts, leather, cotton, rubber or a rope drive, whether new, old, or oily. We will send you a sample can for trial; or, if you prefer, we will advise you further as to its nature.



CLING-SURFACE MFG. CO.,

167-172 VIRGINIA ST., BUFFALO, N. Y.

REPRESENTED IN SALT LAKE BY THE UTAH RUBBER & MFG. CO.

A Practical Test ...

We asked a man the other day what he thought of our pumps.

"Well," said he, "I've used this pump for twenty years, and it's better than most pumps yet."

The best material, workmanship and patented construction—that's why our pumps wear.

Are you going to buy—Write us for full information and catalogue. All free for the asking.

W. T. GARRATT & CO.,
Pump, Bell, Brass and Machine Works,
138-142 Fremont St., San Francisco, Cal.

MINERALS WANTED

Gold and Silver Quartz Specimens, Crystals, Opals, Turquoise, etc., etc.

Buy in Any Quantities—Pay good prices—Cash

E. C. MOLLER,

538 EAST 86th STREET,

NEW YORK

The Pulsometer Steam Pump

"THE MINER'S FRIEND"

Often Imitated—Never Equalled

Over 20,000 in Use

RECENT IMPORTANT IMPROVEMENTS
The Handiest, Simplest and Most Efficient Steam Pump for General Mining, Quarrying, Railroad, Irrigation, Drainage, Coal Washing, Tank-filling and for Pumping Back Liquids heavily impregnated with sediment. Muddy or gritty liquids handled without injury to the Pump.

AGENTS

PARK & LACY CO., A. M. HOLTER HDW. CO., MITCHELL-LEWIS & STAVER CO., San Francisco, Cal. Helena, Mont. Portland, Oregon.

CATALOGUE ON APPLICATION
CORRESPONDENCE SOLICITED

Pulsometer Steam Pump Co.

133 Greenwich Street, New York City

ACIDS.

Consumption is satisfactory and deliveries on contract are moving more easily. Spot supplies of blue vitriol are scarce, and makers are firm.

BRIMSTONE.

Trade is dull and prices low, owing to large stocks in the primary market. Arrivals here this week were 2,900 tons. Best unmixed seconds are quoted on spot at \$20@\$20.50, future at \$20.50/\$21 per long ton, and thirds at \$18.50/\$19.

NITRATE OF SODA.

Holders are opening more freely. Spot is quoted at \$1.60/\$1.625, per 100 lbs. and futures at \$1.55/\$1.575.

FINANCIAL NOTES.

Average Prices of Metals in New York per 100 lbs. from January 1st, 1899:

Month	Copper	Tin	Lead	Spelter
January	14.75	22.48	4.18	5.34
February	18.50	24.20	4.49	6.25
March	17.54	23.82	4.37	6.31
April	18.03	24.08	4.31	6.31
May	18.25	25.76	4.44	6.88
June				
July				
August				
September				
October				
November				
December				
Average				

Average Monthly Prices of Silver.

In New York per ounce Troy, from January 1st, 1899, and for the years 1888 and 1897:

Month	1899	1898	1897
Cents.	Cents.	Cents.	Cents.
January	59.42	59.77	64.77
February	59.42	56.07	64.67
March	59.64	54.90	63.06
April	60.10	56.02	61.85
May	61.23	56.98	60.42
June	—	58.61	60.10
July	59.06	59.61	—
August	59.54	54.19	—
September	60.68	55.24	—
October	60.42	57.57	—
November	60.60	57.91	—
December	59.42	58.01	—
Year	58.26	59.79	—

Treasury deposits with national banks amounted to \$82,136,734, a decrease of \$5,316,875, during this week.

Gold and Silver Exports and Imports.

At all United States ports, for the month of April, 1899, and year from January 1st, 1898, and 1899:

APRIL			
Gold—	1898	1899	
Exports	\$ 1,323,724	\$ 1,162,484	
Imports	3,579,585	2,472,123	
Excess	I. \$31,156,134	I. 1,309,639	
Silver—			
Exports	\$4,099,161	\$4,082,567	
Imports	2,091,066	1,849,231	
Excess	E. \$2,008,095	E. \$2,233,336	
YEAR.			
Gold—	1898	1899	
Exports	\$ 8,741,506	\$ 4,627,672	
Imports	75,944,273	16,574,684	
Excess	I. \$70,202,767	I. \$1,194,021	
Silver—			
Exports	\$16,736,915	19,290,270	
Imports	9,289,757	8,993,835	
Excess	E. \$ 6,467,158	E. \$10,296,425	

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

The Cleveland Mining and Stock Exchange Co.

New England Building, Cleveland, Ohio.

A Reliable Information Bureau for Miners and Investors to obtain FACTS regarding Capital and Mines. Stocks and Mines listed. Send for prospectus.

Morgan-Watson Mining and Construction Co.

800-810 New England Building, Cleveland, Ohio

MINES AND STOCKS { We Buy, Sell, Lease and Bond Mines of all kinds.
We Buy, Sell, and Negotiate sales of mining and other stocks.
We Furnish Machinery to work good mines under special arrangement.
We Furnish Capital to develop mines.

JAMES IRVING & CO.
REFINERS

MINT PRICES PAID FOR
GOLD AND SILVER BULLION.

Largest and most complete establishment in Southern California. Cyanide and Mill Test.

128 N. Main Street (Old Location) Los Angeles, Cal.

ALL THE MINING CAMPS OF UTAH AND COLORADO ARE LOCATED ON OR REACHED BY

The Rio Grande Western Ry.

THE SHORTEST, QUICKEST AND MOST DIRECT ROUTE TO

MERCUR AND CRIPPLE CREEK

P. A. WADLICH,

GENERAL PASSENGER AGENT,

Salt Lake City, Utah

ADOLF FRESE

ENGINEERING INSTRUMENTS

Barometers, Thermometers, Field Glasses, Microscopes and Accessories. Repairing Promptly Done.

126 S. Spring St., LOS ANGELES, CAL.

ADVERTISE

YOUR WANTS

IN THE JOURNAL

WANTS

Advertisements of this class containing not more than five lines will be inserted for not exceeding three months in any year, free of charge, to all paid-up annual subscribers.

Other than above \$1.00 per month.

Advertisements not accepted for less than one month.

COPPER MINE.

State full particulars in regard to development work location, distance from water, price of fuel, character of ore and returns from shipments. Must have at least 1500 feet of development work. Send all information possible. Address,

JAMES HOWARD,
Care JOURNAL Office,
150 Nassau St., New York, N. Y.

GOLD mine anywhere in **United States**, must have at least 1000 feet of **development**; where coal is not over \$6.00 per ton or wood \$4.00 per cord **delivered**; plenty of **water**; no objection to **low grade** ore if profit can be made by having **large plant** to **amalgamate** and **concentrate**; want 6 months working **bond**; no property considered unless **owners** are prepared to deposit **certified check** for expenses of **engineer** if property is not as represented. Address with **price** and **full particulars**

J. E. M., Journal Office,
150 Nassau Street, New York, N. Y.

METALLURGIST and **Chemist**, ten years experience, assaying, ore buying and smelting, at present engaged with large pyritic smelting company in Mexico, desires engagement in the **States** or **British Columbia**.

Address: "W. H. C." JOURNAL Office.

EXPERIENCED men desires position, who can install, run and keep in repair, Steam, Electrical and Mining machinery, has knowledge of assaying and office work. References. Address:

W. H. C., McCLOUD, CAL.

METALLURGIST and experienced **Assayer** and **Chemist**, with practical experience in **Copper** and **Lead** smelting, desires position. Speaks Spanish, highest references, address "Globe", JOURNAL office.

FOR SALE!

A GROUP of 4 Copper claims in Northern Arizona. By-product of gold and silver, recently discovered and show great promise will sell at a great bargain.

R. R. HORNICKER,
DWEY, ARIZ.

TREMAIN Two Stamp Steam Mill at Tucson, Arizona. 15-H. P. Boiler Pump and everything complete, set up ready for work. In excellent condition, used less than six months. Address DREDGING MINING MACHINERY CO., KANSAS CITY, MO.

SAN FRANCISCO, CAL.

ANTIMONY PROSPECTORS having locations of this nature and wishing to sell at once for cash, will do well to address with full particulars, P. O. Box 2075, BALTIMORE, MD.

FOR SALE AT A BARGAIN.

A 60-ton copper smelting plant consisting of two 30-ton furnaces, one of which has new machinery. Plant is complete in every detail. Also an 80-ton Silver-Lead Furnace, entirely new, never having been set up. All of the above located immediately adjacent to railroad. Enquire of GARDINER, WORTHEN & GOSS, dealers in Mining and Mill Supplies, Tucson, A. T.

NOTICE TO STEAM USERS.

The National Association of Stationary Engines is prepared to furnish Engineers or guaranteed ability for any plant in the city or elsewhere. Give us a call. Address: J. T. CHAMBERS, See'y, Engine Room City Hall.

Tel. Main 557. Los Angeles, CAL.

ORE TESTING

Complete mill for testing ores on practical scale by all processes to determine the best process adapted to treating any ore submitted. Processes in use investigated to overcome unnecessary losses, etc.

RICKETTS & BANKS,

Metallurgists & Chemists

NEW YORK CITY

See

Mining Stock Quotations

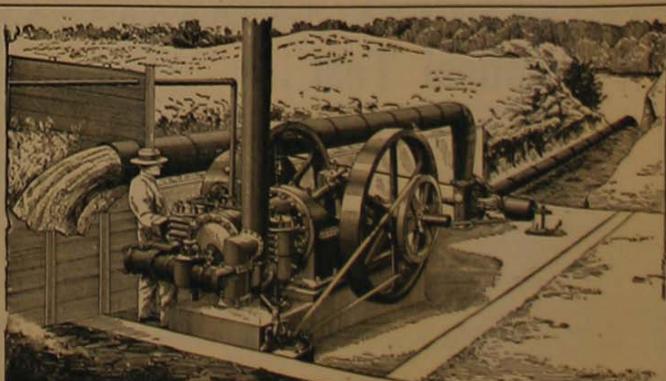
Page 21

John Wigmore & Sons Co.

MACHINERY
Mine and Mill Supplies, Iron and Steel

117 to 123 S. Los Angeles Street,

LOS ANGELES, CAL.



LARGEST GASOLINE PUMPING PLANT IN THE WORLD

The illustration shows the gigantic pumping plant recently built by the Hercules Gas Engine Works on the Packer Ranch, Colusa Co., 80 h. p. Hercules Engine, pumping 7200 gallons a minute, 27 feet high. Burns Gasoline or Distillate oil. Cheapest power known. Gas, Gasoline and Oil Engines, 2 to 200 h. p. Send for Catalogue. HERCULES GAS ENGINE WORKS, 216 Bay St., San Francisco.

MINING STOCK QUOTATIONS

BOSTON

Adventure	12 00	Mass	12 00
Allouez	9 00	Merced.	9 00
Anaconda	65 00	Mohawk.	28 00
Arcadian	50 00	New Quicksilver	8 00
Arnold	12 00	Old Colony Min.	10 00
Atlantic	28 00	Old Dominion	31 00
Baltic	8 00	Osceola	82 00
Bingham.	12 75	Parrott	56 00
Bonanza	5 50	Pioneer	2 50
Boston & Mon'	30 00	Quincy.	152 50
Breece	2 00	Rhode Island.	9 50
Butte & Boston	73 75	Santa Fe.	12 50
Calumet & Hecla	0 00	Santa Ysabel.	13 00
Catalpa	35	Tamarack	214 00
Centennial	33	Tecumseh	6 50
Cochiti	12 50	Tl'l-Mountain	10 00
Copper Range	45 00	Victor	5 50
Dominion Pref.	118 00	United States	24 87 1/2
Franklin	18 00	Utah Mining	6 00
Gold Dredging	34 00	Winona	14 50
Humboldt	2 50	Wolverine.	43 00
Isle Royale	45 00	Wyandotte.	9 00
Melones	4 00		

COLORADO SPRINGS STOCKS

Acacia	89 1/4	Hayden	—
Alamo	88	Ingham Con.	97 1/2
Altamont	87 1/2	Isabel	55
American Con	84	Jack Pot	42 1/2
Anaconda	54	Kingsbury	73 1/2
Ara	22	Lexington	—
Arcadia Cons	—	Magnet Rock	—
Banksers	—	Montreal	37 1/2
Banner	—	Mountain Beauty	64 1/2
Bob Lee	—	Mollie Gibson	27 1/2
Creede & C. C.	11 1/2	Moon-Anchor	1 05
Cripple Crk Con	10 1/2	Moun Rosa	24 1/2
Dante	—	New Haven	2 1/2
Elkton Con.	—	Orphan Bell.	6 9
El Paso	24 1/2	Pharmacist	65 1/2
Emma Almes	6 1/2	Pilgrim	68 1/2
Fannie B.	—	Pond	1 05
Farrelle	—	Albert	6 1/2
Findley	14 1/2	Rattler	0 7
Flyer of the W'st	20 2/5	Specimen	0 83 1/2
Golden Fleece	33 1/2	Theresa	0 83 1/2
Gold & Globe	0 47	Trachyte	0 47
Gould	26 1/2	Union Gold	—
Granite Hill	—	Vindicator	22 1/2
Worl	21 1/2		

SALT LAKE CITY

Alice	80	Joe Bowers	12 1/2
Ajax	135	Joe Bowers Ex.	08
Alliance	10	La Reine	86
Anchor	—	Little Pittsburgh	88 1/2
Buckeye	50	Lower Mammoth	46 1/2
Bullion Beck	50	May Day	65
C. Eureka	40	Mountain Smooth	2 00
Chloride Point	25	Mercur	7 40
Daisy	21	Northern Light	65
Dalton	02	Omaha	40
Dalton & Lark	09	Ontario	6 50
Daly	135 1/2	Petro	71
Daly West	90	Rich. Anaconda.	07
Dexter	25	Sacramento	46
Eagle	05	Shower Con.	38
Eagle & Blue Bell	37 1/2	Silver King	40 00
Four Aces	12	Star Consolidated	99
Galea	28	Sunbeam	35
Geyser-Marion	62 1/2	Swansea	3 85
Golden Eagle	05	Tetra	1 45
Grand Central	80	Tetra	05
Homestake	10 1/2	Utah	92
Horn Silver	150	Valeo	1 09 1/2
Ingots	25	West M'N P'ller	25

NEW YORK

Adams Con	15	Isabella	80
Alamo	07	Iron Silver	55
Alice	130	Jefferson	50 1/2
Alliance	10	Jennie Blanche	45 1/2
Anaconda	55 50	Justine	02 1/2
Antonado Gold	54	King & Pemh	20
Anchor L.	92 1/2	Lewiston Cons	11
Argentum Juniat	30	Little Chief	17
B. Ichcr	54	Mexican	45
Best & Belcher	80	Mt. Rosa	26 1/2
Burt Gold	2 05	Ontario	8 00
Breeze	25	Occidental	28
Buhler	20	Phoenix	11
Brunswick	21	Portland	1 97 1/2
Chollar	25	Portland	1 97 1/2
Chrysolite	12	Pharmacist	06
Comstock Tunnel	05	Phoenix	10
Comstock Stocks	05	Plymouth	8 00
Con. Cal. & Va.	15	Potosi	29
Cr. & Cr. Creek	10	Quicksilver	2 25
Crescent	15	Quicksilver pfd.	8 00
Cripple Creek Con	10	Rancho Mountain	03 1/2
Crown Point	20	Red Mountain	03 1/2
Cripple Creek Con	10	San Juan Star	03 1/2
Deadwood	60	Savage	22
Elkton Cons	91	Sierra Nevada	34
Enterprise	30	Small Hope	1 35
Garfield Cons.	13	Specimen	07
Good Samaritan	—	Standard	2 50
Gold Coin C. Cr.	1 95	Syndicate	08
Gold Coin Gilpin	35	Union Con.	40
Golden Fleece	33	Union	21 1/2
Gold & Globe	33 1/2	Utah Con.	10
Gould & Currry	38	Union Gold	—
Gregory Gold	22	Vindicator	—
High Five	22 1/2	Work	20
Homestake	55 00	Yellow Jacket	35
Horn Silver	1 73		

SPOKANE, WASHINGTON

Bur. Hr.	28	Number Six	12
Black Tail	17	Palo Alto	12
Bryan and Sewall	05	Pearl	12
Butte and Boston	15	Pearl	12
Butte and Boston	17 1/2	Pocahontas	04
Hardman	03	Princess Maude	16
Eureka First Th't	05	Quip	18
Eureka Queen	08 1/2	Rehate	19
Golden Harvest	07 1/2	Republic	3 75
Gold Leaf	05	Republic Big Six	09 1/2
Iron Monitor	09 1/2	Republic No. 2	06 1/2
Jim Blaine	57	San Poll	85
Liberty	04	Surprise	12
Lone Pine Cons	42 1/2	Thoughtful	02
Merrimac	09 1/2	Tom Thumb	22
Monroe	08	Trade Dollar	12
Morning Glory	20	Treasury	05
Mountain Lion	67 1/2		

DENVER STOCK REPORT

Aetna	—	Keystone	11 1/2
Anchoria Leland	—	Lillian	31 1/2
Academia	51	Mates	27 1/2
Arcadia	44	Mollie Gibson	27 1/2
Argentum Juniat	—	Moon Anchor	1 05
Baumer	—	Mt. Rosa	24 1/2

NOTE—The above Mexican stocks are figured on the basis of Mexican silver

LUMBER

The Southern California Lumber Co., Stimson Bld., Los Angeles, Cal., Chas. Wier Manager, sells

At Wholesale Prices

Mining Timbers a Specialty

Write for Prices

51 Beale St. and 9 to 17 Stevenson St.,

San Francisco, Cal.

FROM CRIPPLE CREEK

AIR COMPRESSORS,
ROCK DRILLS,
Stone Channelers,
The Pohle Air Lift Pump,
Coal Cutters,

THE INGERSOLL-SERGEANT DRILL COMPANY, HAVEMEYER BUILD'G
NEW YORK
PARKE & LACY CO., AGENTS, SAN FRANCISCO, CAL.

Special.

JAMES F. BURNS, Pres't. JOHN HARNAN, Gen. Mgr.

FRANK G. BRCK, Sec'y and Treas.

THE PORTLAND GOLD MINING CO., (Stock Transfer Office, Colorado Springs.)

Mines at Victor, Colorado.

COLORADO SPRINGS, COLO., May 19, 1898.

The Ingersoll-Sergeant Drill Co.,

Gentlemen:—We bought two years ago one of the largest size of the straight line type of Ingersoll-Sergeant Piston Inlet Compressor.

This was found to be too small for our needs about a year ago and we purchased of you a Duplex Corliss machine 16" x 18 1/2" x 42".

This was set in place in our shaft house in the Cripple Creek District, 10,000 feet above the level of the sea, and has been running continuously ever since, and at times over ten years. Eclipse drills. The steam cylinders were connected to an independent Jet Condenser, for which we are using the mine water, and the resultant economy of operation is very noticeable.

The operation of this Compressor is as near perfect as that of any machine we have ever seen, and this type is well worth the extra cost on account of the great permanent economy in operation.

Our mine is equipped exclusively with your drills and we have only the highest words of praise to give them.

Yours very truly, THE PORTLAND GOLD MINING CO., Jas. A. Burns, President

INCORPORATED MINES PAYING DIVIDENDS.

NAMES OF MINES		LOCATION	No. of Shares	Capital Stock	Par Value	Amount of last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Minerals Produced
1	Aetna Cons.	California	100,000	\$ 500,000	\$ 5	\$ 10	Apr 1899	\$ 170,000	Q.
2	Alaska, Treadwell	Alaska	200,000	5,000,000	25	37½	Apr 1899	4,070,000	G.
3	Alaska Mexican	Alaska	200,000	1,000,000	5	10	Apr 1899	353,031	G.
4	Alice	Montana	400,000	10,000,000	25	05	April 1898	1,075,000	G. S. L.
5	Anaconda	Montana	1,200,000	30,000,000	25	1 25	May 1899	9,750,000	C.
6	Anchoria Leland	Colorado	600,000	600,000	1	03	Apr 1899	198,000	G.
7	American Gold	Colorado	300,000	3,000,000	10	09	Mar 1899	407,000	G. S. L.
8	Associated	Colorado	1,250,000	1,250,000	1	01	Dec 1898	72,000	G.
9	Bald Butte	Montana	250,000	250,000	1	06	Mar 1899	679,848	G. C. S.
10	Big Six	Colorado	500,000	500,000	1	00½	May 1898	15,000	G. S.
11	Boston & California	California	600,000	600,000	1	06	March 1899	36,000	.....
12	Boston and Colorado Smelting	Colorado	15,000	750,000	50	5 00	April 1899	375,000	.....
13	Boston & Montana	Montana	150,000	3,750,000	25	6 00	May 1899	10,775,000	G. C. S.
14	Breeco	Colorado	200,000	5,000,000	25	05	June 1899	50,000	L.
15	Bullion Beck and Champion	Utah	100,000	1,000,000	10	10	Apr 1899	2,358,400	G. S.
16	Bunker Hill and Sullivan	Idaho	300,000	3,000,000	10	07	Apr 1899	648,000	S. L.
17	Cariboo	British Col.	800,000	800,000	1	01½	Feb 1899	248,965	G.
18	Calumet & Hecla	Michigan	10,000	2,500,000	25	10 00	Mar 1899	60,850,000	C.
19	Centennial Eureka	Utah	30,000	1,500,000	50	50	Apr 1899	2,085,000	S. L.
20	Central Lead	Missouri	10,000	1,000,000	100	50	May 1899	107,000	L.
21	Champion	California	34,000	340,000	10	25	April 1898	296,200	G.
22	Charleston	S. Carolina	10,000	1,000,000	100	1 50	Dec 1898	180,000	.....
23	Colorado Smelting	Montana	100,000	1,000,000	10	1 00	Jan 1899	1,945,000	G. S. C.
24	Consolidated Tiger and Poorman	Idaho	1,000,000	1,000,000	1	02	Dec 1898	20,000	G. S.
25	Creston Leasing	Colorado	1,000,000	1,000,000	1	01	Dec 1898	54,000	.....
26	Crowned King	Arizona	600,000	6,000,000	10	02	Dec 1898	232,000	G. S. L.
27	Doe Run	Missouri	5,000	500,000	100	50	May 1899	72,500	L.
28	Elkton Consolidated	Colorado	1,250,000	1,250,000	1	01½	Nov 1898	656,961	G. S.
29	Empire State	Idaho	75,000	750,000	10	20	May 1899	146,233	.....
30	Enterprise	Colorado	500,000	500,000	1	05	Sept 1898	900,000	S. L.
31	Ferris-Haggerty	Wyoming	1,000,000	1,000,000	1	00½	Mar 1899	5,000	C. G. S.
32	Geyser-Marion	Utah	300,000	1,500,000	5	02	Sept 1898	98,000	G.
33	Gold Coin of Victor	Colorado	1,000,000	1,000,000	1	01	May 1899	200,000	G.
34	Gold King	Colorado	1,000,000	1,000,000	1	02	May 1899	30,000	G.
35	Golden Cycle	Colorado	200,000	1,000,000	5	02	May 1899	175,500	.....
36	Golden Reward	S. Dakota	1,000,000	1,000,000	.....	15	Feb 1898	155,000	G.
37	Grand Central	Utah	250,000	250,000	1	15	May 1899	493,750	G. S. C. L.
38	Gwin	California	20,000	1,000,000	50	25	Apr 1899	65,500	G.
39	Highland	S. Dakota	100,000	10,000,000	100	20	May 1899	3,884,718	G.
40	Holy Terror	S. Dakota	300,000	300,000	1	01	Mar 1899	122,000	G.
41	Homestake	S. Dakota	125,000	12,500,000	100	50	Apr 1899	7,431,250	G.
42	Horn Silver	Utah	400,000	10,000,000	25	05	April 1899	5,280,000	S. L.
43	Idaho	British Col.	500,000	500,000	1	05½	Jan 1899	292,000	.....
44	Iowa	Colorado	1,000,000	1,000,000	1	00½	June 1898	90,000	G.
45	Isabella	Colorado	2,250,000	2,250,000	1	06	Feb 1899	405,000	G.
46	Jack Pot	Colorado	1,000,000	1,000,000	1	02½	Mar 1899	25,000	G.
47	Jersey Leasing	Colorado	200,000	200,000	1	03½	Oct 1898	137,875	.....
48	Lake Superior Iron	Michigan	84,000	2,100,000	25	1 00	Feb 1899	736,000	L.
49	Le Roi	British Col.	500,000	2,500,000	5	10	Apr 1898	775,000	G.
50	Lillie	Colorado	1,000,000	1,000,000	1	05	Apr 1899	215,360	G.
51	Minnesota	Minnesota	185,000	18,500,000	100	1 50	Oct 1898	4,735,000	L.
52	Modoc	Colorado	500,000	500,000	1	02	May 1899	130,000	G.
53	Montana Ltd	Montana	660,000	3,300,000	5	12	Apr 1899	2,997,557	G. S.
54	Montana Ore Purchasing	Montana	40,000	1,000,000	25	1 00	Apr 1899	1,040,000	.....
55	Morning Star	California	2,400	240,000	100	2 50	Apr 1899	720,600	G.
56	Mt. Rosa	Colorado	1,000,000	1,000,000	1	02	Jan 1899	60,000	G.
57	Mercur	Utah	200,000	5,000,000	25	12½	Jan 1899	1,266,000	G.
58	Mammoth	Utah	400,000	10,000,000	25	05	Dec 1898	1,350,000	G. S. C. L.
59	Matoa	Colorado	1,000,000	1,000,000	1	02½	Dec 1898	25,000	G.
60	Mead	California	2,000,000	2,000,000	1	20	Mar 1899	100,000	G.
61	Montreal	Colorado	1,000,000	1,000,000	1	01	Nov 1898	7,500	.....
62	Monument	Colorado	300,000	300,000	1	01	Dec 1898	12,624	.....
63	Moulton	Montana	400,000	2,000,000	5	05	Feb 1899	480,000	.....
64	Moon Anchor Gold	Colorado	600,000	600,000	1	07½	Nov 1898	261,000	G.
65	Mountain Copper	California	250,000	6,250,000	25	62½	Sept 1898	93,750	C.
66	New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	May 1899	1,050,000	S. G.
67	Napa	California	100,000	700,000	7	20	Apr 1899	990,000	Q.
68	New Idria Quicksilver	California	100,000	500,000	5	20	Apr 1899	120,000	Q.
69	North Star	California	200,000	2,000,000	10	25	Apr 1898	550,000	G.
70	Ophir Hill	Utah	1,000	25,000	25	20 00	Dec 1898	20,000	.....
71	Osceola	Michigan	50,000	1,250,000	25	2 00	Dec 1898	2,552,500	C.
72	Parrot	Montana	230,000	2,300,000	10	30	Mar 1899	2,345,898	C.
73	Pennsylvania Consolidated	California	51,500	5,150,000	10	05	May 1899	64,525	.....
74	Pioneer	California	100,000	1,000,000	10	12½	Mar 1899	62,500	G.
75	Portland	Colorado	3,000,000	3,000,000	1	02	May 1899	2,187,080	G. S.
76	Plumbago	California	300,000	300,000	1	15	Jan 1899	45,000	G.
77	Quincy	Michigan	100,000	2,500,000	25	3 50	Feb 1899	10,470,000	C.
78	*Republic Consolidated	Washington	3,000,000	3,000,000	1	01	April 1899	30,000	G.
79	Rambler-Cariboo	British Col.	1,000,000	1,000,000	1	01	April 1899	50,000	.....
80	Royal Consolidated	British Col.	2,500,000	2,500,000	1	01	Mar 1899	25,000	G.
81	Sacramento	Utah	1,000,000	5,000,000	5	00½	Apr 1899	82,000	G.
82	Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	Feb 1899	3,325,000	S.
83	South Swansea	Utah	150,000	150,000	1	05	Apr 1899	147,500	S. L.
84	Standard	California	200,000	20,000,000	100	10	May 1899	3,859,226	G. S.
85	St. Joseph	Missouri	30,000	3,000,000	10	1 50	Mar 1899	2,822,000	L.
86	Silver King	Utah	150,000	8,000,000	.20	25	May 1899	2,975,000	S. L. G.
87	Smuggler	Colorado	1,000,000	1,000,000	1	01	Jan 1899	1,105,000	S. L. Z.
88	Swansea	Utah	100,000	500,000	5	05	May 1899	161,500	S. L.
89	Tamarack	Michigan	60,000	1,500,000	15	4 00	Dec. 1898	5,570,000	C.
90	Tomboy	Colorado	200,000	2,000,000	10	25	Dec 1898	650,000	G.
91	Utah	Utah	100,000	1,000,000	10	02	Jan 1899	179,000	G.
92	Victor	Colorado	200,000	1,000,000	5	50	Dec 1898	1,155,000	G.
93	Vindicator	Colorado	1,500,000	1,500,000	1	05	Apr 1899	203,000	G.
94	War Eagle	British Col.	2,000,000	1,000,000	1	01½	May 1899	309,000	.....
95	Wolverine	Michigan	60,000	2,500,000	25	1 50	Apr 1899	150,000	C.
96	Yellow Aster	California	100,000	1,000,000	10	10	Apr 1899	178,789	G.

S. Silver; G. Gold; L. Lead; C. Copper; Q. Quicksilver; I. Iron; Z. Zinc.

N. B.—Companies not listed have not paid a dividend for the last twelve months.

*Paid since consolidation \$30,000; Republic paid \$120,000 under old management.

THE CAMMET CONCENTRATOR

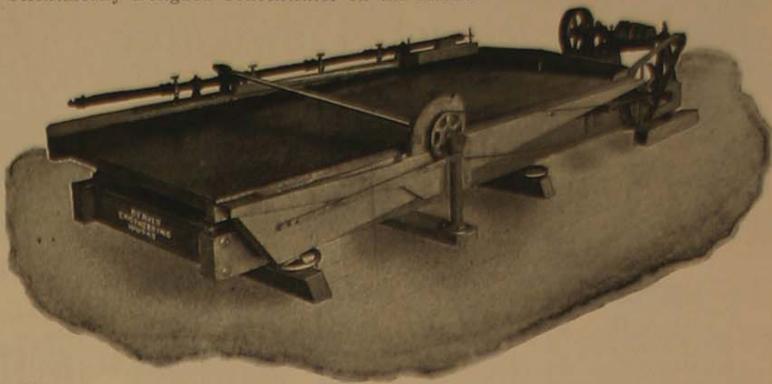
The Most Recently Developed and Scientifically Designed Concentrator on the Market

PRICE, Including All Extra Attachments complete, f. o. b.

Denver, \$450

We do not tell you that this Concentrator will take the place of two or three Belt Machines—you are supposed to be intelligent enough to know this. We do tell you, however, that this concentrator will do more work than any Concentrator on the market.

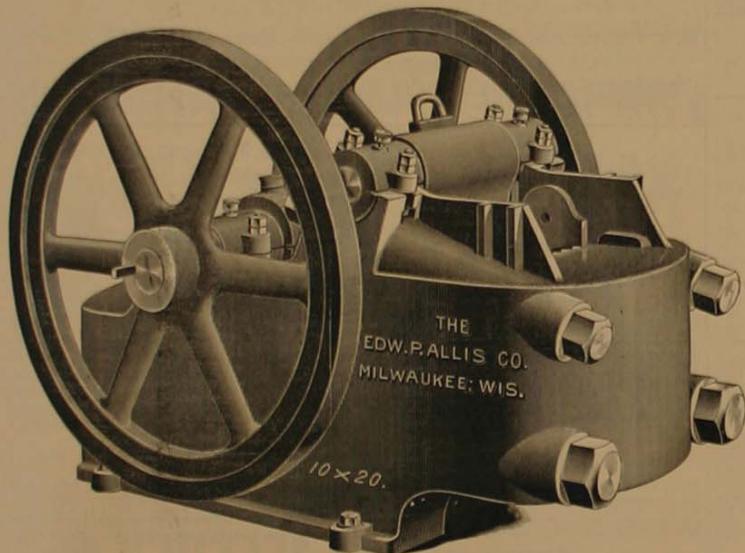
Thoroughly protected by strong patents.



Denver Engineering Works,
Sole Manufacturers.

Denver, Colorado, U. S. A.

Reliance ORE AND ROCK Crushers



This Cut shows our latest designs in Ore and Rock Crushers

AMERICAN MANUFACTURERS OF

RELIANCE
CRUSHING ROLLS
STAMP MILLS
ORE FEEDERS
AND RELIANCE
VANNERS

CATALOGUE ON APPLICATION

THE EDWARD P. ALLIS CO.,

Milwaukee, Wis.

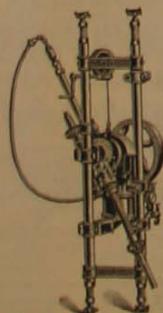
SULLIVAN MACHINERY CO.

CHICAGO, ILLINOIS

Sullivan Diamond Prospecting Drills

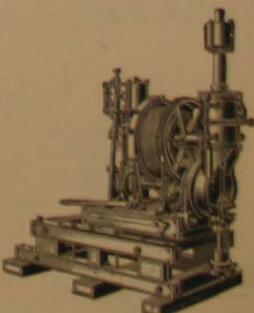
FOR PROSPECTING FOR and DEVELOPING MINERALS

Rock Drills for Sinking, Drifting and Stoping



Knight & Stone, Agents, Spokane, Washington
Denver, Col. Office: 332 Seventeenth Street

Henshaw, Bulkley & Co., Agents, San Francisco, Cal.
New York Office: 71 Broadway





MAKING THINGS RUN SMOOTHLY

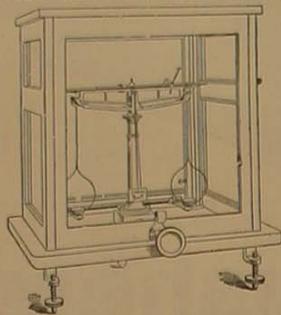
The shop machinery cannot run easily unless the engine which drives its works freely and without friction.

A Detroit Lubricator

on the engine makes it run evenly and without any loss from friction or unnecessary wear. It saves more than it costs every few days and prolongs the life of the engine. Catalogue sent on application, and prices quoted if desired.

DETROIT LUBRICATOR CO., Detroit, Mich.

QUEEN NO. 4 ASSAY BALANCE



Aluminum Beam, Agate Knives and Planes
Sensitivity 1-100 mg. The Best Low-Price Assay
Balance on the Market. Send for Circular.

QUEEN & CO.,
Optical and Scientific Instrument Works
1010 Chestnut Street,
N. Y. Office, 59 Fifth Ave. Philadelphia

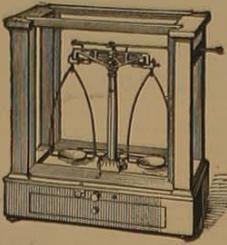
TIMOTHY W. SPRAGUE, S. B.

WITH
CHARLES HENRY DAVIS, C. E.
CONSULTING ENGINEERS
99 CEDAR ST., NEW YORK 4 STATE ST., BOSTON
DREXEL BLDG., PHILADELPHIA
Electric Transmission of Power and Mine
Equipments

ESTABLISHED IN 1840

HENRY TROEMNER,

170 Market St., Philadelphia, Pa.



Assay Balances and Weights

in use in all the U. S. Assay Offices
in America

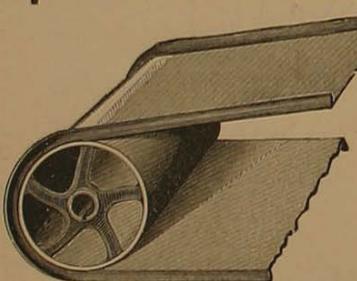
PRICE LIST ON APPLICATION

GASOLINE ENGINES

Gasoline Engines from 2 to 10 horse
power. Mine ventilators operated by
Gasoline Engines.

TEMPLE MACHINE CO.,
1513 Wazee Street, Denver, Colorado

Spadone's Concentrator Belts Patented



This illustration shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. We avoid this Mechanical Defect by our Spadone Curved Edge. Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

Send us your order for Water, Air Drill,
Steam, Suction and Fire HOSE, RUBBER
BELTING, RUBBER PACKING and
LEATHER BELTING.

Amalgam Plate Cleaners. Our Amalgam Plate Cleaners are made of Pure Rubber in moulds, thus insuring a plate cleaner which will not scratch the plates and a perfect edge which will clean the Amalgam plates evenly. They are made 6 inches long, 3 inches wide and 1 in. thick, making a convenient size to handle. Price by mail to any address, each 75c. Correspondence solicited.

The Gutta Percha Rubber & Mfg. Co., 30 and 32 Fremont St., San Francisco, Cal.

ELECTRIC

BLASTING APPARATUS

Adapted for Firing all Kinds of Explosives used in Blasting

Victor Electric Platinum Fuses

Superior to all others for exploding any make of dynamite or blasting powder. Each fuse folded separately and packed in neat paper boxes of each. All tested and warranted, single and double strength with any length of wires.

Blasting Machines.

The strongest and most powerful machines ever made for electric blasting. They are especially adapted for submarine blasting, large railroad quarrying, and mining works.

Victor Blasting Machine.
Fires 5 to 8 holes; weight 15 lbs;
adapted for prospecting, etc.

Insulated Wires and Tapes, Blasting
Caps, Fuse, Etc.

SEND FOR CATALOGUE

MANUFACTURED ONLY BY

James Macbeth & Co.

128 Maiden Lane, New York, U.S.A.

BRANCH OFFICE: 308 Market Street, San Francisco, Cal.



THE J. H. MONTGOMERY MACHINERY COMPANY.

1216 TO 1230 CURTIS ST., DENVER, COLO., U.S.A.

More than 4,000 in use. Made of wrought iron and steel. Can be packed on animals anywhere. The deadlock holds the load when an accident occurs.

20-Page Catalogue
FREE.



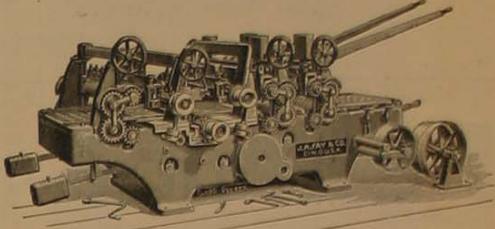
Price of One-Horse Whim, complete, with shievers.	\$1.
Two-Horse Whims, complete, with shievers.	\$150
Pumping Attachment with Pipe for either.	\$40.
Blower Attachment with Pipe for either.	\$30.

Also Four, Eight and Twelve-horsepower Whims.

All kinds of New and Second-Hand Machinery

J. A. FAY & EGAN CO. CINCINNATI, OHIO

Wood Working Machinery



— FOR —

Box Factories, Planing Mills, Sash, Door & Blind Factories
Carriage, Wagon and Agricultural Shops.

HENSHAW, BULKLEY & CO., Agents, San Francisco, Cal.

From 1 to 40,000 pounds
weight

Of Open Hearth or Chester Steel. True
to Pattern, Sound, Solid. Gearing of all
kinds and Crank Shafts. Shees, Dies,
Crusher Plates, Bosses, Taffets and Roll
Shells. Steel Castings of every descrip-
tion.



Chester Steel Castings Co.,
Works Chester, Pa., Office, Library St.
Phila., Pa.

WHY

Spend your money to buy new machinery to put on Un-
proved Mines which may not be a success when you can buy
Pumps, Hoists, Shafting, Pulleys, Air-Compressors,
Engines, Boilers and in fact any Machinery you need for a
Mine or Mill, as good as new, at the

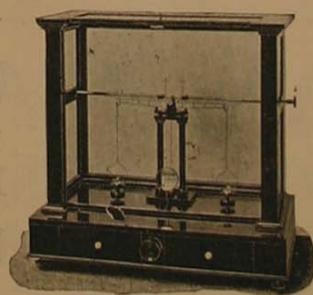
Denver Variety Machine Shops, THOS. CROW, Prop.

1712 Blake St., DENVER, COLORADO

WEIS & GIBSON,
Assayers and
Analytical Chemist

51 Clark St, Chicago, Ill.

Assays and analyses of all kinds. Mail orders
promptly attended to. Mining properties ex-
amined and reported upon. Term on application



ANSWORTH NO. 043

Sensitivity. — 1-100 Milligramme

Ten inch beam on which you can weigh from
1-100 to 1 Milligramme with a 1 Milligramme
rider.

Wm. AINSWORTH & SONS

1251 LAWRENCE ST. DENVER, COLO.

JEFFREY
ELEVATORS
AND CONVEYORS
FOR HANDLING MATERIAL OF ALL KINDS.



WIRE CABLE CONVEYORS.

For long and

short distance

conveying.

THE JEFFREY MFG. CO.
Columbus, Ohio.

41 DEY STREET,
NEW YORK.

Send for Catalogue.

Western Branch, — Denver, Colorado
Frank R. Field, Manager.



Quartz Screens
A specialty. Diamond, slot or square, slot holes. Genuine Russia Iron, Homogeneous Steel, Cast Steel or American planished Iron, Zinc, Copper or Brass Screens for all purposes. CALIFORNIA PERFORATING SCREEN CO., 145-147 Beale St., S. F.

Diamond Prospecting Drills.



Machines of all Capacities
American Diamond Rock Drill Co.
120 LIBERTY ST., N.Y.
P. O. Box 1442

The Kootenai Gold Mining District

of British Columbia, which of late has been attracting considerable attention, is best reached by the Oregon Railroad and Navigation Co. The fact has recently been brought out that the Kootenai district contains within its borders more *High Grade Silver and Lead Mines* than any other part of the world. The recent discoveries of *Rich Gold Lodes* makes it the most attractive country for the Capitalist Miner and Prospector to visit in search of mines.

The Oregon Railroad and Navigation Co.
Dispatch Fast Steamers every Four Days

from San Francisco connecting at Portland, Oregon with their rail line for all points in this famous district. For full particulars address,

E. C. WARD, GENERAL AGENT.
SAN FRANCISCO, CAL
630 Market Street,

NEW HAVEN MFG. COMPANY

NEW HAVEN CONN.

IRON WORKING TOOLS,



Engine Lathes, Pulley Turning Lathes, Iron Planers, Slotters, Upright Drilling Machines, Horizontal Drilling and Boring Machines, Etc.

HENSHAW, BULKLEY & CO., Agents, San Francisco, Cal.



SMITH & THOMPSON

Manufacturers of

Fine Assay Balances

Write for Catalogue

2219 Stout street Denver, Colo.

J. B. Pope

U. S. Mineral Surveyor,
SAN BERNARDINO, CAL.

FOR SALE VERY CHEAP.

2,000 TENTS used a few days at G. A. R. Reunions, etc., every size and shape from a 10x12 wall tent to a 125x175 circus tent, including family compartments tents, refreshment tents, stable tents and preaching tents; also 800 canvas cots and 300 gasoline lamps; guaranteed in first class condition; 1,500 new bed blankets; 1,200 wool horse blankets. Write for prices.

C. J. BAKER,
104 W. 3d St., Kansas City, Mo.

ANTIMONY.

We buy Antimony Ore in any quantity and pay prompt CASH for same. Write us and let us know what you have.

Chapman Smelting Works Co.,
(INCORPORATED)

422 Battery Street. San Francisco, Cal.



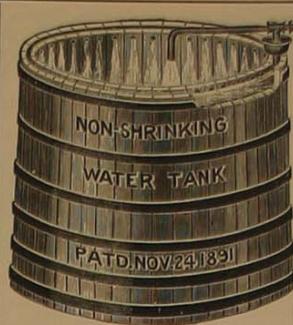
Independent Assay Office.

ESTABLISHED 1888.

D. W. Reckhart, E. M., Proprietor.
Agent for Oro Shippers.
Analys and Chemical Analysis.
Mines Examined and Reported Upon.

BULLION WORK A SPECIALTY.

P.O. Box 88, Office and Laboratory
Cor. San Francisco and Cluahua Sts.,
EL PASO, TEXAS.



TANKS

OF EVERY DESCRIPTION
FOR

Mines, Mills and Cyanide Plants
Patent Non-Shrinking WaterTanks

The only Tank that will stand the Desert
and Hot Climate.
Write for Catalogue and Estimate on any kind
of Tank Work.

Pacific Tank Co.

33 BEALE ST., SAN FRANCISCO
348 EAST 2d STREET, LOS ANGELES

To Gold Miners!

Silver Plated Copper AMALGAMATING PLATES

For Saving Gold In Quartz and Placer Mining.
EVERY DESCRIPTION OF MINING PLATES MADE.
Only Best Copper and Refined Silver Used. Old Min-
ing Plates Replated. Twenty-six Medals Awarded.

Gold, Silver, Nickel, Copper & Brass Plating.

Old copper mining plates bought or taken in exchange for new
silver-plated plates and full value allowed. Gold extracted from old
plates at a moderate cost by a new and economical process. Old plates,
which often contain a surplus of gold above the cost of plating, can be
re-plated.

Denniston's San Francisco Plating Works
653 and 655 Mission Street, San Francisco, Cal.
Telephone, Main 5931.

E. G. DENNISTON,

Send for Circular.

Proprietor

R. A. PEREZ, E. M.

Assayer and Chemist

Manager of the Bi-Metallic Assay Office and Chemical Laboratory
Assaying of Ores, Furnace Products, etc.
Amalgamation and Cyanide Tests Carefully Made

Formerly: Underground and surface surveyor for the Coahuila and Alamo Coal Cos.,
Coahuila, Mexico.
Assistant Chemist for the Wharton Iron Furnace, Port Oram, N. J.
Chief Assayer for El Paso Smelting Works, El Paso, Texas.
Assistant Chemist Consolidated Kansas City S. and R. Co., Argentine, Kan.

124 South Main Street,

Los Angeles, Cal.

ESTABLISHED 1859

Herman Kohlbush Sr.

59 Nassau Street,
New York, N. Y.

MANUFACTURER OF

Fine Balances
and Weights

For every purpose where accuracy
is required.

• • •

Send for Illustrated Catalogue

THE WILSON

Forged High Grade Steel Shoes and Dies

Guaranteed to Wear Longer and Prove Cheaper than any others.
Made by use of Special Appliances. Patented Aug. 10th, 1892.

Made only by

WESTERN FORGE AND ROLLING MILLS
St. Louis, Missouri

JOSHUA HENDY MACHINE WORKS
SOLE AGENTS

38 to 44 Fremont Street, San Francisco, Cal.

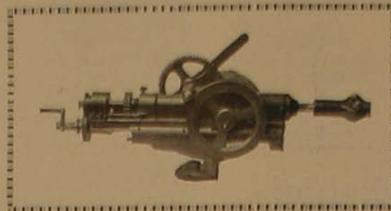
The JACKSON DRILL and M'F'G. CO.

CEDAR WATER GOLD MINING CO., Gen'l Office,
SAGINAW, MICH., November 13, 1898.

The Jackson Drill & Mfg. Co., Denver, Colo.

GENTLEMEN:—Yours of the 10th received. In reply, I have written four of the parties, whose names you have sent, and must confess I got very flattering reports from each.

Yours truly,
(Signed) W. F. STEVENS, Pres.



GENERAL OFFICES:

DENVER COLORADO

1756 Larimer St.

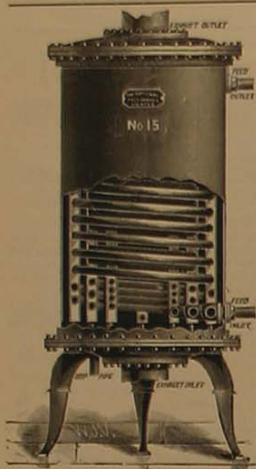
Soe Licensees for all Foreign Countries and

Eastern United States,

THORNTON N. MOTLEY COMPANY, (Inc.)

43 John St., New York.

Write for Circulars and Testimonials to your hardware dealer or to the Company



The National Feed Water Heater

Highest Premium at World's Fair

800,000 HORSE POWER IN USE

SIMPLICITY
CHEAPNESS
RELIABILITY
EFFECTIVENESS

Henshaw, Bulkley & Co.,
Agents,
SAN FRANCISCO, CAL.

P. & B. PAINT

FOR MINES, SMELTERS, CHLORINATION WORKS,
THE CYANIDE PROCESS.

P. & B. Roofing put up in Rolls to lay 200 square feet, with Paint and Nails.
Absolutely Acid and Alkali Proof.

PARAFFINE PAINT CO., Manufacturers, 312-314 W. 5th St., Los Angeles



The Eynon-Korting Compound Injector

The Best for
Quartz Mill and Smelter
Boilers



Brass, Bronze and Copper Castings of every description.
Send for Catalogue of the
Injectors, Condensers, Blowers, Ventilators, Blast Nozzles,
Siphons, Exhausters, Etc.

THE EYNON-EVANS MFG CO.,
15th and Clearfield Streets, PHILADELPHIA, PA

ENRIQUE C. CREEL, President

JUAN A. CREEL, Manager

Compania Industrial Mexicana

MANUFACTURERS OF

MINING * MILLING * AND * SMELTING MACHINERY

STAMP MILLS

Engines,

Amalgamating Pans

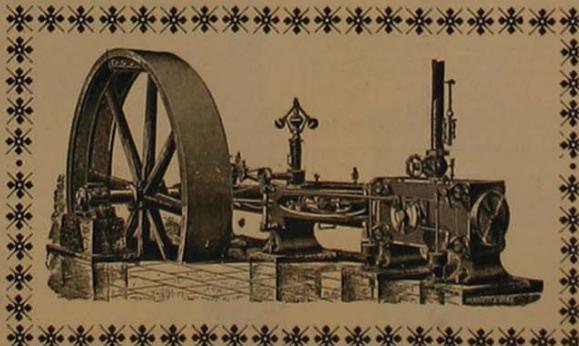
Hoists,

Huntington Mills,

Cyanide Mills,

Stamp Mill Mortars,

Air Compressors,



Concentrators

Pelton Water Wheels

Water Jacket Smelters,

Pumps,

Rolls and Jigs,

Ore Cars * Slag Cars

Crushers,

Boilers.

Amalgamating Plates, Cams Shoes, Dies

Roasters,

Electric Light Machinery.

We are prepared to meet any Prices, for Milling, Smelting and Mining Machinery
Address all communications to the Company. Correspondence Solicited.

Chihuahua,

Mexico

THE CUMMER DRYERS.

FOR DRYING ...
... EVERYTHING
MECHANICALLY

Concentrates, ores, coal, bricks, clay, etc.
No Steam is used.

Hundreds in Operation

F. D. CUMMER & SONS CO.,

CLEVELAND, OHIO

Ores! Ores! Ores!!

Gold, Silver and Lead Ores and Concentrates

Purchased at Reduced Rates for Treatment.

Selby Smelting and Lead Co.

416 MONTGOMERY ST., San Francisco

Consign Shipments to Vaciejo Junction, Cal.

MINERS' OUTFITS.

IRON MORTARS,
AMALGAM MORTARS,
GOLD WASH PANS,
MINERS' HORNS,
BATEAS, CRUCIBLES,
HORSE-SHOE MAGNETS
MAGNIFYING GLASSES
IRON RETORTS,
CHEMICALS, SCALES,
WEIGHTS, ETC.

Including a full assortment of Mine and Mill Supplies, Assay-
ers' Materials, Etc.

Sole Agents for the
Pacific Coast for the

W. S. TYLER WIRE WORKS CO.
Manufacturers of

Steel and Brass Wire Battery Screens
Agents for Baker & Adamson's Chemically
Pure Acids. A full Stock always
on hand.

Nitric Acid, sp. gr. 1.42; Muriatic Acid, sp. gr.

1.20; Sulphuric Acid, sp. gr. 1.845.

JOHN TAYLOR & CO.
63 FIRST ST., SAN FRANCISCO

Prices on application.

RIVETED SHEET STEEL WATER PIPE

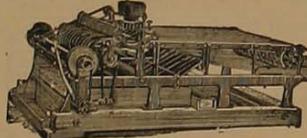
For Placers, Water Powers, Irrigation, Etc.

THE WEIGLE PIPE WORKS

2949-51 Larimer St.

DENVER, COLO.

WOODBURY CONCENTRATOR



No. 141 First St., - San Francisco



THE Denver Fire Clay Co.

Assayers' and Chemists' Supplies

MANUFACTURERS OF:

Crucibles, Scorifiers & Muffles
And all other kinds of
Fire Clay Material.

SPECIALTIES—Strictly c. p. Acids
Test Lead, Bone Ash, Cyanide
Potash, Argol, Borax, Borax Glass
Iron Sulphides, Litharge, Soda
Mining Fluxes, etc.

Sole Agents for the
Ainsworth Balances e

OFFICES

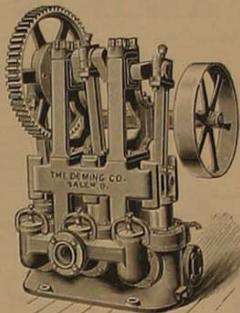
FACTORY: 3101-3141 Blake St., 1742-1746 Champa St., Denver, Col.

THE DEMING

TRIPLEX POWER PUMP

The Best Made

Steel Crank Shafts, Cut Gearing, Outside
Packed Plungers, Single and Double
Acting Triplex Electric Pumps



E. E. BURLINGAME & CO., ASSAY OFFICE AND CHEMICAL LABORATORY

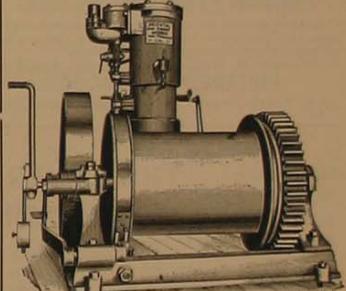
Established in Colorado 1866. Samples by mail
express will receive prompt and careful attention
Gold & Silver Bullion Refined, Melted and Assayed
Concentration Tests—100 lbs. or car load lots.
1736-1738 Lawrence St., Denver, Colo.

CLARENCE HERSEY, Assayer and Chemist,

(Established 1879)

LEADVILLE, COLORADO
Samples by Mail or Express Re-
ceive Prompt Attention

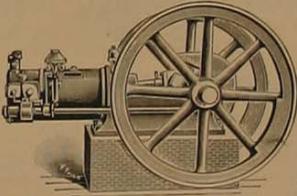
SPECIMEN ASSAY PRICES:
Gold silver and lead, \$1.00; any two of the
above, 75¢; any one of above, 50¢; copper analy-
sis, \$1; platinum, nickel or tin, \$5.00.
Write for full price list and mailing envelopes



THE OTTO GAS ENGINE

51000 IN ACTUAL USE

The Original, the Highest Efficiency and
Most Economical



Henshaw, Bulkley & Co.,

AGENTS

SAN FRANCISCO, CAL.

ORIENTAL HOIST

Any Size Built on Demand
Simplest and Best Mining Hoist Built
Write for Particulars and Prices

Oriental Gas Engine Co.

105 BEAL ST., SAN FRANCISCO, U. S. A.

WHITE, ROGERS & COM'Y.

CONSTRUCTING ENGINEERS AND MILLWRIGHTS

306 PINE STREET, SAN FRANCISCO, CAL.

Wilfley Concentrator, Price \$450 f.o.b. San Francisco

One of these Machines will take the place of TWO or THREE Belt Concentrators of any
make and do very much better work.



We furnish superior Machinery and erect Stamp Mills, Hoisting and Pumping Works operated by Steam or Water Motors. Complete Concentrating and Smelting Plants for the concentration and recovery of gold, silver, copper and lead. Improved Power Drills and Air Compressors, Wire Rope Tramways, etc.

The Wilfley Table is fully covered by U. S. Patents Nos. 580,338 and 590,675.
Infringements will be prosecuted to the full extent of the law.

These Machines are Kept in Stock Ready for Immediate Shipment

The Globe ... Machine Works

High Grade Machinery.

Repairing. Make a specialty of building the Best Engine in the United States.

137-139 W. 2d St., Cincinnati, O.

SEE Incorporated Mines
Paying Dividends, PAGE 22

Perforated Metals

GRIZZLEYS FOR PLACER MINING, BATTERY SCREENS
STEEL SHEETS FOR TROMMELS.

THE ROBT. AITCHISON PERFORATED METAL CO.,
269 Dearborn St., Chicago, Illinois

FRANCIS SMITH & CO.,
MANUFACTURERS OF

SHEET IRON & STEEL PIPE

MINING PIPE ALL SIZES

Hydraulic, Irrigation and Power Plants, Well Pipe, Etc., all Sizes.

Iron cut, punched and formed, or making pipe on ground where required. All kinds of Tools supplied for making Pipe. Estimates given when required. Are prepared for coating all sizes of Pipes with Asphaltum.

46 Fremont Street

San Francisco, Cal.

HOME MANUFACTURE

FOWLER'S

Air Space and Asbestos
Manufacturing Company

Sectional Removable Covering
for Steam Boilers, Pipes, etc.
A Non-Conductor, Unequalled
Absolutely Fire Proof



G. C. FOWLER, 656-58 Howard Street
SAN FRANCISCO, CAL.

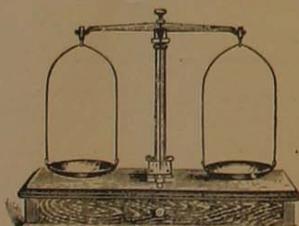
C. DUCOMMUN,

300-302 N. MAIN STREET,

LOS ANGELES

Assayers Material
Mine and Mill Supplies

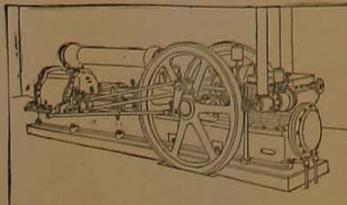
Dixon's Black Lead Crucibles, Denver Fire Clay Crucibles, Muffles, Scorifiers, etc.; Quicksilver, Drill Steel, Retorts, Mortars, Gold Pans, Drilling Hammers, Drifting Picks, Horn Spoons and Shovels.



NORWALK IRON WORKS CO.

SOUTH NORWALK, CONNECTICUT.

THE NORWALK AIR and GAS COMPRESSOR



In use in every State in the Union, Central America, and South America, Great Britain, etc. Also used by the U. S. Army and Navy.

Especially Designed for
Driving

ROCK DRILLS,
PNEUMATIC LOCOMOTIVES, ENGINES, PUMPS
COAL CUTTERS.

and Other Mining Machinery. The Best Machine for Compressing Air for all Dynamic Purposes.
Send for Illustrated Descriptive Catalogue.

HENSHAW, BULKLEY & CO., Agents

San Francisco

Eastern Prices Beaten

Improved Facilities, Finest Work Lowest Prices



Perforated Sheet Metals

For Flour and Rice Mills, Grain Separators, Shaker Screens, Gravel and Cement, Stamp Batteries, Iron, Steel, Russian Iron, American Planish, Zinc, Copper and Brass Screens, for all uses.

San Francisco Pioneer Screen Works

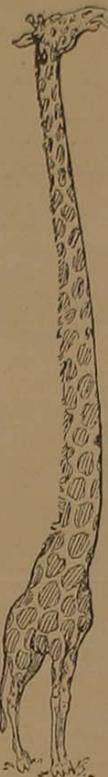
(ESTABLISHED 1860)
221 and 223 First St., San Francisco, Cal.
JOHN W. QUICK, PROPRIETOR

A Comparison ...

Compare the

MINING AND METALLURGICAL JOURNAL

with others published in the West, and you will find it head and shoulders above them all.



WRITE FOR ADVERTISING
RATES

OFFICES:

Stimson Block, Los Angeles, Cal.

150 Nassau Street, New York

N. OHLANDT & CO.

MANUFACTURERS OF

Best Quality of BONE ASH for Assayers.

Our Goods are used in all parts of the United States and Mexico.

EXTRA No. 1 and No. 2

CORRESPONDENCE SOLICITED

327 MARKET STREET, SAN FRANCISCO, CAL.

The M. and E. Co.

Machinery & Supplies

Mining Hoists--Geared & Friction

Engines

"OIL CITY" STATIONERY,
"BATES" CORLISS.
"IDEAL" AUTOMATIC.
"OIL CITY" Gas and Gasoline.

Boilers

"GEARY"
WATER TUBE

"SNOW" Mine and Sinking
LAWRENCE Centrifugal
RUMSEY Power

Pumps

Shafting, Belting, Pulleys, Hangers, Boxes, Etc. Write for Prices

The Machinery and Electrical Company,

Los Angeles, Cal.

351 & 353 N. Main Street,

Buyers of
ALL CLASSES OF
BULLION, MATTE,
ORE, SILVER SUL-
PHIDES,
CYANIDES, GOLD
and SILVER BARS.

CONSOLIDATED Kansas City Smelting AND Refining

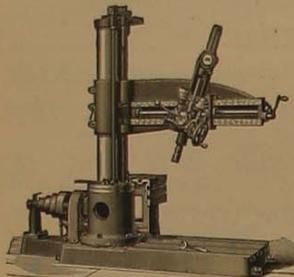
COMPANY

SMELTING WORKS
LEADVILLE, COLO.; EL PASO, TEXAS;
ARGENTINE, KAN.; BOQUILLAS, MEX.

REFINERY :
ARGENTINE, KANSAS

Manufacturers of
ALCHEMIST-
BRAND
BLUE VITROL
ZINC SULPHATE

Half Universal Radial Drills



The special features which have so highly recommended this style of Drills are our double columns, steel gearing, power and hand feeds, quick return motion to spindle. Furnished in three sizes, with large variety of tables, adapting the drills for every class of work possible.

Bickford Drill and Tool Co.

CINCINNATI, OHIO, U. S. A.

HENSHAW, BULKLEY & CO., AGENTS

San Francisco, Cal.

ORE CARS.

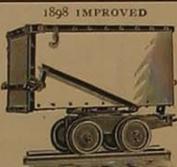
All miners who have used the Truax Automatic Ore Cars say they are the best in the market.

Over 3,000 in Use

MANUFACTURED IN

SAN FRANCISCO, CAL., by

The Truax Mfg. Co.,
114 First Street



1898 IMPROVED
PATENTED:
Jan. 8, 1892. Aug. 7, 1895.
July 19, 1895.
In Canada, June 21, 1895.

MANUFACTURED IN
DENVER, COLORADO, by
The Truax Mfg. Co.

1717-1719 Wazee St.

We make all kinds of cars, skips and charging carts for the Mine, Mill and Smelter. All miners should have our pamphlet of useful information.

Dealers wanted in Mining Sections to handle the TRUAZ ORE CARS.

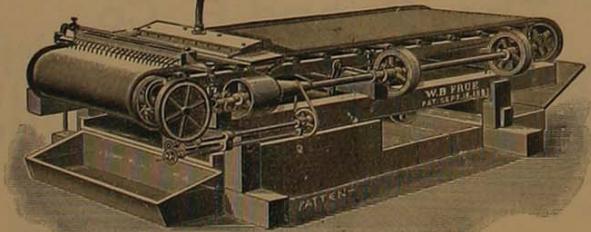
THOMAS PRICE & SON

Analytical Metallurgical and Physical Testing Laboratory

524 SACRAMENTO STREET, SAN FRANCISCO, CAL.

FOUR and SIX FOOT FRUE VANNERS

With Brownell "Patent Lip" Flange Belts



After a Concentrator like the Frue Vanner has been on the market nearly two decades, and the sales have constantly increased, it is safe to say it is the "Standard Machine of the world." More Frue Vanners have been sold during the last twelve months than for the same period at any time during the history of the machine. Practical mining men in all parts of the world where mining is carried on will testify as to its merits. It is the "Standard" which all competitors are trying to imitate.

The results obtained by this machine are the "Acme" of concentration, and several cheap and untried machines that have failed to meet the market compare by it, and the manufacturer will tell you that they are "just as good, and cheap, etc." The facts are that no other concentrator made has an equal capacity, or will yield as clean a concentrate, with as small loss in the tailings as the Frue Vanner. The amount saved from the lower first cost of the inferior machine counts little in the years results, when compared with the increased output from a Frue. This machine not only gives better results at both ends of the belt (i.e. Clean product and poor tailings), but is operated at less expense and requires less attention than any other machine on the market. At the Alaska Treadwell Mine where they have ordered over 350 Frue Vanners one man attends 48 machines for 12 hour shift.

FOR DESCRIPTIVE PAMPHLETS, ADDRESS

JAS. S. BROWNELL, Western Agent
132 Market Street,

FRUE VANNING MACHINE CO.

(Successor to Adams & Carter)

SAN FRANCISCO, CAL.

ESTABLISHED 1871

C. L. BERGER & SONS

Successors to

BUFF & BERGER

Mining and Engineering Transits

With patent interchangeable auxiliary, Telescope for use on top or side in vertical sighting.

Our friends are cautioned against infringements foreign or domestic as attempts have been made of late to mislead the public.

Send for Illustrated Catalogue and Manual

11 Province Court, - Boston, Mass.

F. A. JONES, E. M.
MINING ENGINEER

Assays, Surveys, Reports, Plans, Etc., Chemist State Geologic Survey.

OLIVER W. KRULL, Mining Engineer Asst.

OFFICE AND LABORATORY

14 W. Missouri Ave., Kansas City, Mo.



Cut Shows **Robins Belt Conveyor**
Handling 1100 tons per hour
of Rock and Gravel on

River Dredge

For 1899 catalogue description of system
Write to

Robins Conveying Belt Co.
147 Cedar Street, New York City

GOODSELL'S "98" PUMP & PACKING



WAX END SEWED.

Patent Pending

No possibility of Splitting. All imperfect features of Duck packing overcome. Price 75c lb net.

Goodsell Packing Co.,
SOLE MAKERS

33 South Canal Street Chicago, Illinois

SWEEPINGS ★

Metallic Wastes, Dental Scraps, Photographers' Wastes, Jewelers' Sweeps, Mill Wastes, Amalgamated Plates, Old Iron Retorts, Old Quicksilver bought.

A. M. DONALDSON & CO., Denver, Colorado

The Little Alaska Gold Washer

WEIGHT 7 1/2 POUNDS

Positively Saves all the Gold

No Miners, Prospectors or Assayers outfit is complete without it. Requires no experience to work.

Handsome descriptive catalogue mailed free on application,

PRICE \$6.00

204 S. BROADWAY, LOS ANGELES, CAL.

THE PUEBLO Smelting and Refining Company,

PUEBLO, COLORADO.

BUYERS OF

Gold, Silver, Lead and Copper Ores,
Copper Matte and Bullion.

Refiners of Gold, Silver, Lead and Copper.

Manufacturers of Bar and Pig Lead, Lead Pipe, Antimonial Lead, Copper Ingots,
Granulated Test Leads and Litharge.

Pays Highest Prices for all classes of Ores.

Especial Attention to Sampling by most Approved Processes.

Quick Returns on all Consignments.

THE NATIONAL IRON WORKS



Riveted Boilers, Tanks, and Sheet Steel or Iron Work of every description.
MANUFACTURER OF THE

National Steel Ore Car Repairing of All kinds Promptly Attended to.
PORTLAND, OREGON

FULTON ENGINE WORKS Mining, Milling & Smelting Machinery

Estimates Furnished on all Classes of Mining Work
P. O. Box 296, STATION "C" LOS ANGELES, CALIFORNIA

Bullock's Diamond Prospecting Core Drills

These are the only Machines which will give absolutely accurate records of borings. Fifteen styles and sizes. Operated by hand, horse, steam, air or electricity.

Monarch Rock Drills

Any style of mounting. Simple, compact, economical. Operated by air or steam
Hoisting and Haulage Machinery to fill any requirements.

M. C. BULLOCK MFG. CO.,
1169 West Lake Street, CHICAGO, ILLINOIS

Chas. P. Grimwood,
Mining Engineer and Metallurgist
Laboratory, 214 Pine Street, SAN FRANCISCO, CAL.

CYANIDE POTASSIUM—99 per cent. pure, Beckton Brand.
CHLORIDE LIME—Best English in Casks and Drums.

ZINC DUST—Best Heavy Quality.

POTASH PERMANGANATE—Pure Quality.

SODA HYPOSULPHITE—Barrels and kegs.

AND ALL OTHER CHEMICALS

Please Apply to Schoelkopf, Hartford & MacLean, Ltd.,
100 William Street, New York

FOR SALE.

Four Fraser & Chalmers horizontal Boilers in batteries of two, can be seen set up
Size of Boilers: 54" x 16", 44 3/4" flues, half arch front, include all fittings complete
and in first class order; will sell 2 or 4. Price each, \$300.

One 300-H. P. Fraser & Chalmers Corless Engine Cylinder, 24x48", sectional fly
wheel, 20" x 37". Engine in fine condition. Price \$1,500.

Forty-stamp Mill, 850 lbs. rapid drop, together with timbers, bolts, rods, &c.; also
building if wanted. Tuloc automatic ore feeders, screens, jigs (Heads), Frue
Vanner tables, &c., fine condition and very cheap. Write or come and see us.

S. S. Machinery Co., Denver, Colo.

Oilless Bearings



For

Rope Tramways, HOISTING
Engines, Tackle Blocks,
Cam Shafts in STAMP
MILLS. A PRACTICAL BEARING THAT
RUNS WITHOUT OIL
The Graphite
Lubricating Company
ROUND BROOK, N. Y.

MINING MACHINERY.

If you want mining machinery of the
first class address the MINING AND MET-
ALLURGICAL JOURNAL, stating the pur-
pose to which it is to be applied, and you
will be placed in communication with
the leading manufacturers of repute. All
the latest catalogues of mining machinery
are kept constantly on hand.

Stimson Block, Los Angeles, Cal.
150 Nassau St., New York, N. Y.

Horace F. Brown, M. E.

Mechanical Roasting, Cooling and
Conveying of Ores. Automatic
millling plants adapted to
standard processes.

PRESENT ADDRESS, VICTOR, COLORADO

Established 1887

B. Sc. Members American Chemical Society

WADE & WADE ASSAYERS 

Chemical Analysis, Milling, Concentration and Cyanide Tests

Call and See our Stamp Mill and Frue Vanner.

115 N. MAIN ST., LOS ANGELES, CAL.

FRASER & CHALMERS

133 Fulton Street,
Chicago, Illinois, U. S. A.
43 Threadneedle Street,
E. C., London, England



Mining Machinery

STAMP MILLS
ROCK CRUSHERS
HUNTINGTON MILLS
SMELTING FURNACES
GRAY'S PATENT MINE CHAIRS
CONCENTRATORS
HOISTING ENGINES
ROASTING FURNACES
BALL PULVERIZERS

Exclusive Manufacturers of
RIEDER PUMPS and
AIR COMPRESSORS

For

UNITED STATES, CANADA,
MEXICO, SOUTH AMERICA,
ENGLAND, SOUTH AFRICA
AND AUSTRALIA.

The accompanying picture shows the Air Compressor we make

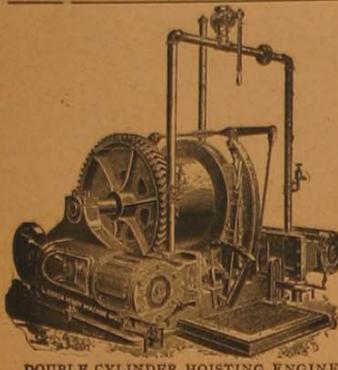
Fraser & Chalmers, GENERAL AGENTS FOR GREEN BLOWERS

JOSHUA HENDY MACHINE WORKS, Nos. 38 to 44 Fremont St.

Manufacturers of and Dealers in

The Latest Improved

Quartz Milling, Pumping, Hoisting and Smelting
Plants, Air Compressors and Rock Drills.



DOUBLE CYLINDER HOISTING ENGINE

"HENDY" IMPROVED "TRIPLE-DISCHARGE" TWO-STAMP QUARTZ MILLS
Boilers, Engines & Pumps of all capacities

PLANS, SPECIFICATIONS and ESTIMATES OF COST SUBMITTED and CONTRACTS ENTERED INTO
FOR FURNISHING and ERECTING MINING and MILLING PLANTS for all conditions of Use.

BAKER IRON WORKS

Manufacturers of

Mining and Milling Machinery, Atlas Engines and Boilers, Worthington Steam Pumps

LOS ANGELES, CALIFORNIA

Water Works Machinery
A SPECIALTY

LAMBERT HOISTING ENGINES

ELECTRIC HOISTS

BUILT TO GAUCES AND TEMPLATES

600 STYLES AND SIZES

Prospectors and Contractors Engines | Mining Engines and Electric Hoists,
Single and double drums with | with single, double or triple drums,
and without boilers. | Friction or reversible.

SEND FOR NEW CATALOGUE R, 140 PAGES.

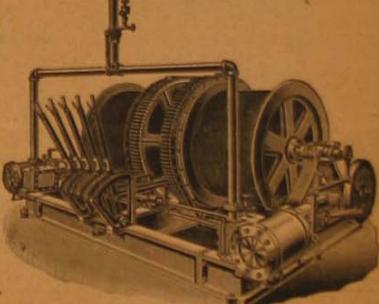
LAMBERT HOISTING ENGINE CO.

MAIN OFFICE AND WORKS:

117 PONIERS ST., NEWARK, N. J.

17 Main St., CAMBRIDGEPORT, MASS.

143 Liberty St., N. Y.



Mining Timbers and Construction Lumber

(Caledonia Long Leaf Yellow Pine Lumber)

Prices given for delivery to any point in Mexico by Rail through Porfirio Diaz, Nuevo Laredo or Paso del Norte, and by Vessel through Gulf Ports of Tampico and Vera Cruz.

Bradley-Ramsay Lumber Co.

LOUISIANA, U. S. A.

ADDRESS INQUIRIES FOR PRICES TO

R. N. WATSON, AGENT.

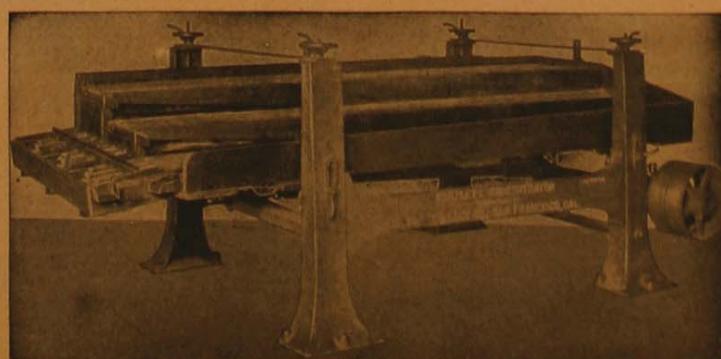
APARTADO NO. 118 MONTEREY, N. L. MEXICO

The Bartlett Concentrating Table

One of these Machines will take the place of **TWO OR THREE** Belt Concentrators of any make and do as good work. Separates ALL the minerals from each other at one operation. Gives **THREE CONCENTRATES** on the one Machine at the same operation. The Machine is especially adapted to the separation of Zinc and Lead. Size of machine 4 ft. by 8 ft., Weight 1000 lbs., Capacity 10 to 30 tons per 24 hours.

Can be set up anywhere.
Requires no Special Foundation.

Licensee for the
Manufacture and Sale



Three Classes of Machines are made

Table A is adapted to concentration from 1 into 1 to 8 into 1. Table B, 6 into 1 to 16 into 1. Table C, 12 into 1 to 32 into 1.

Parties desiring tests made can send 500 lbs. or more, charges prepaid, and a run will be made and reports forwarded of the results, free of all charges, except for the assays which will not exceed \$10.00.

Price of 9½ ft. Table \$300 Complete,
12-foot Table \$350,
f. o. b. Cars, San Francisco, Cal.

Los Angeles, Cal. Office,

306 Byrne Bldg.
W. H. Miller, Representative

21 and 23 Fremont Street
SAN FRANCISCO, CAL.

PARKE & LACY COMPANY.